

ORDER NO.VMD0104009C8

Service Manual

Digital Video Camera/Recorder

Panasonic

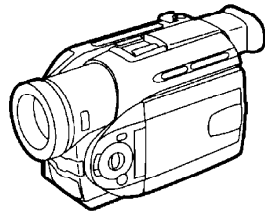
Mini DV PAL

MultiMediaCard™
SD™

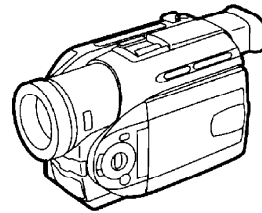
NV-DS27EG / NV-DS27EGM / NV-DS27EGE / NV-DS27B / NV-DS28EG / NV-DS28EGM / NV-DS28B / NV-DS28EN / NV-DS28ENC / NV-DS28ENT / NV-DS28A / NV-DS37EG / NV-DS37EGM / NV-DS37B / NV-DS38EG / NV-DS38EGM / NV-DS38B / NV-DS38EN / NV-DS38ENT / NV-DS38A

VOL.1

N-MECHANISM



**NV-DS27
NV-DS28**




**NV-DS37
NV-DS38**

SPECIFICATIONS

SPECIFICATIONS

ITEM	SPECIFICATION	ITEM	SPECIFICATION
POWER	Source: Battery Pack; 7.2 V DC AC Adaptor; 7.9 V DC Consumption: During Camera Recording Using The LCD Monitor ;3.6 W (NV-DS27/DS28) ;4.0 W (NV-DS37/DS38) During Camera Recording Using The Viewfinder; 2.9 W (NV-DS27/DS28) ;3.3 W (NV-DS37/DS38)	AUDIO	RECORDING FORMAT: PCM Digital Recording; 16 bit (48 kHz/2 ch) 12 bit (32 kHz/4 ch)
			MIC IN LEVEL: -50 dB (0 dB = 1 V/Pa, 1 kHz) (Stereo mini jack) OUTPUT LEVEL (LINE): 316 mV, 600Ω INPUT LEVEL (LINE): 316 mV, 10 kΩ or more (NV-
RECORDING FORMAT	Digital Video SD Format	DIGITAL STILL PICTURE	Digital Still Picture Output, Control Signal Input / Output (Transfer rate: max. 115 kbps)
TAPE FORMAT	Mini DV Cassette Tape (Tape width 6.35 mm)	DIGITAL INTERFACE	DV Output Terminal (i.LINK, 4 pin): NV-DS27/DS37 DV Input/Output Terminal (i.LINK, 4 pin): NV-DS28/DS38
TAPE SPEED	SP mode : 18.83 mm/s LP mode : 12.57 mm/s Record/Playback Time: SP mode ; 80 min. with DVM80 LP mode ; 120 min. with DVM80	MICROPHONE	Stereo
	PICK-UP ELEMENT: CCD (Charge Coupled Device)	SPEAKER	1 round speaker φ28 mm
CAMERA	STANDARD ILLUMINATION: 1,400 lx	OPERATING TEMPERATURE	0-40 °C
	MINIMUM REQUIRED ILLUMINATION: 1 lx (Digital Gain-up Mode)	OPERATING HUMIDITY	10-80 %
	LENS: 15 : 1 Power Zoom, Auto Iris, F1.8, Macro (Full Range AF) Focal Length; 3.1-46.5 mm Filter Diameter; 37.0 mm	WEIGHT	Approx. 620 g (without Battery and DV Cassette); NV- DS27/DS28
	IMAGE SENSOR: 1/4-inch CCD Image Sensor	STANDARD ACCESSORIES	Approx. 77 (W) x 96 (H) x 179 (D) mm 1 pc. AC Adaptor 1 pc. Battery Pack Unit 1 pc. Shoulder Strap 1 pc. DC Input Cable 1 pc. AC Mains Cable 1 pc. AV Cable 1 pc. Remote Controller 1 pc. Bottom-type Battery 1 pc. Head Cleaner: NV-DS28EN/ENC/ENT/A, NV-DS38EN/ENT/A 1 pc. Hood Cap Unit 1 pc. SD Memory Card: NV-DS37, NV-DS38 1 pc. Interface Cable: NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 1 pc. CD-ROM: NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38
	VIEWFINDER: Colour Electronic Viewfinder 2.5-inch Colour LCD Monitor		
VIDEO	RECORDING FORMAT: Digital Component		
	TELEVISION SYSTEM: CCIR: 625 Lines, 50 Fields PAL Colour Signal		
	VIDEO OUTPUT LEVEL: 1.0 Vp-p, 75Ω S-VIDEO OUTPUT LEVEL: Y; 1.0 Vp-p, 75Ω C; 0.286 Vp-p, 75Ω VIDEO INPUT LEVEL: 1.0 Vp-p, 75Ω (NV-DS38) S-VIDEO INPUT LEVEL: Y; 1.0 Vp-p, 75Ω C; 0.286 Vp-p, 75Ω (NV-DS38)		
Card Memory Functions (NV-DS37/DS38)	Recording Media: MultimediaCard, SD Memory Card Image Compression: JPEG		

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

1. INTRODUCTION

1.1. INTRODUCTION1

This service manual contains technical information which will allow service personnel's to understand and service this model. Please place orders using the parts list and not the drawing reference numbers. If the circuit is changed or modified, this information will be followed by supplement service manual to be filed with original service manual.

Note 1:

Assembly, Disassembly and Adjustment procedures for Mechanism-Chassis are separate volume. Please refer to following manual for detail of Mechanism Chassis.

Service Manual Order number for N-Mechanism-Chassis: VMD0105012C8

Note 2:

These movie camera uses AC Adaptor is VSK0581.

The service manual for AC Adaptor is separate volume.

Order number for AC Adaptor-----VSK0581 : VMD0004017C8

Note 3:

This service manual does not contain the following information, because of the impossibility of servicing at component level.

- 1. Schematic Diagram, Block Diagram and C.B.A. layout of Main C.B.A.**
- 2. Parts List for individual parts of Main C.B.A.**
- 3. Exploded View and Parts List for individual parts of Mechanism Unit.**

When a part replacement is required for repairing Main C.B.A., replace the assembly parts. (Main C.B.A.)

The following circuits are contained in Main C.B.A.

- 1. Main Connection Circuit**
- 2. Drive Circuit**
- 3. Video 1 Circuit**
- 4. Video 2 Circuit**
- 5. Control Circuit**
- 6. Camera Circuit**
- 7. Lens Drive Circuit**
- 8. LCD Circuit**
- 9. Head/ Rec Amp Circuit**

10. Power Circuit

The following circuits are contained in DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38)

1. DSC Ex Connection Circuit

2. Ex Input Circuit

3. DSC Circuit

Since DSC/Ex In C.B.A. is not serviceable at component level due to 1 or 2 piece of CSP IC mounted on it with no space, 7 years retention period for the part supply is applied to this DSC/Ex In C.B.A. as ordinary ICs.

Note 4:

DSC/Ex In C.B.A. (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38) is not categorized as a recycle module part.

Please do not send the faulty DSC/Ex In C.B.A. to DVC Repair Center.

2. CAUTION FOR AC CORD (VJA0940 TYPE)

2.1. INFORMATION FOR YOUR SAFETY

IMPORTANT

Your attention is drawn to the fact that recording of pre-recorded tapes or discs or other published or broadcast material may infringe copyright laws.

WARNING

To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.

CAUTION

To reduce the risk of fire or shock hazard and annoying interference, use the recommended accessories only.

FOR YOUR SAFETY

DO NOT REMOVE THE OUTER COVER

To prevent electric shock, do not remove the cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

2.2. CAUTION FOR AC MAINS LEAD

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three-pin mains plug for your safety and convenience.

A 5-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amperes and it is approved by ASTA or BSI to BS1362

Check for the ASRA mark or the BSI mark on the body of the fuse.



If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover, the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

If the fitted moulded plug is unsuitable for the socket outlet in your home then the fuse should be removed and the plug cut off and disposed of safely.

There is a danger of severe electrical shock if the cut off plug is inserted into any 13-ampere socket.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt, please consult a qualified electrician.

2.2.1. Important

The wires in this mains lead are coloured in accordance with the following code:

Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

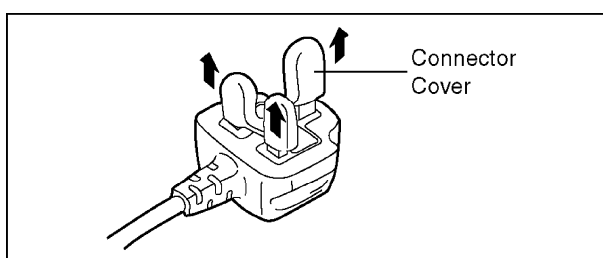
The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstances should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol.



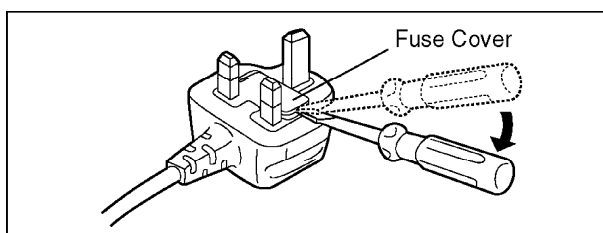
2.2.2. Before use

remove the Connector Cover as follows.

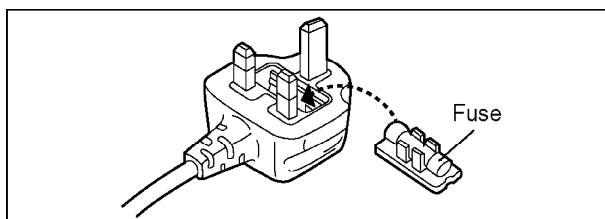


2.2.3. How to replace the Fuse

1. Remove the Fuse Cover with a screwdriver.



2. Replace the fuse and attach the Fuse cover.



3. SERVICE CAUTION

3.1. EEPROM DATA FOR SPARE PARTS OF THE MAIN C.B.A.

When the Main C.B.A. is replaced, the fixed and average data must be changed by Tatsujin kit according to the Movie Camera's suffix.

Then, confirm and/or adjust the VTR and Camera adjustment one by one.

3.2. SERVICE EXTENSION CABLES.

This models is required the following extension cables for all connections.

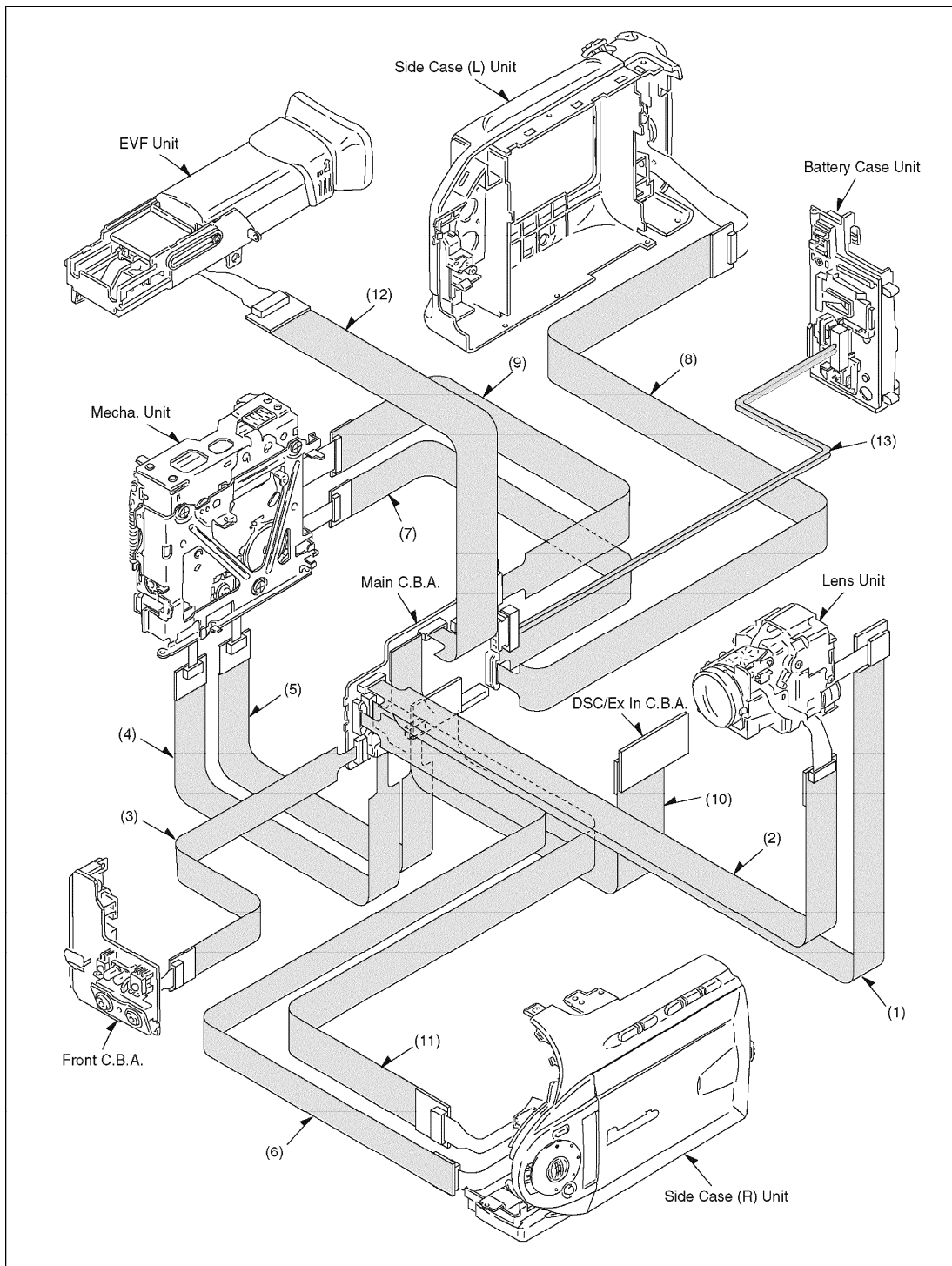
Note 1:

Use the following extension cables when checking or adjusting individual circuit boards except module Parts. (Main C.B.A.)

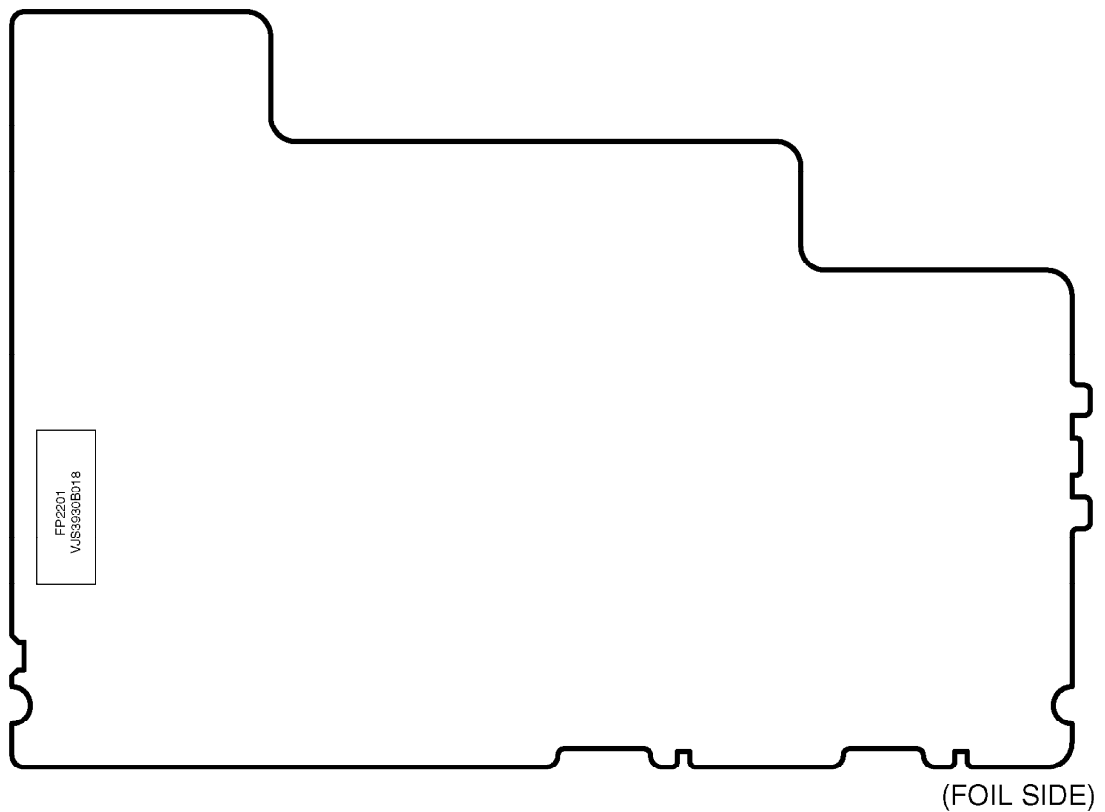
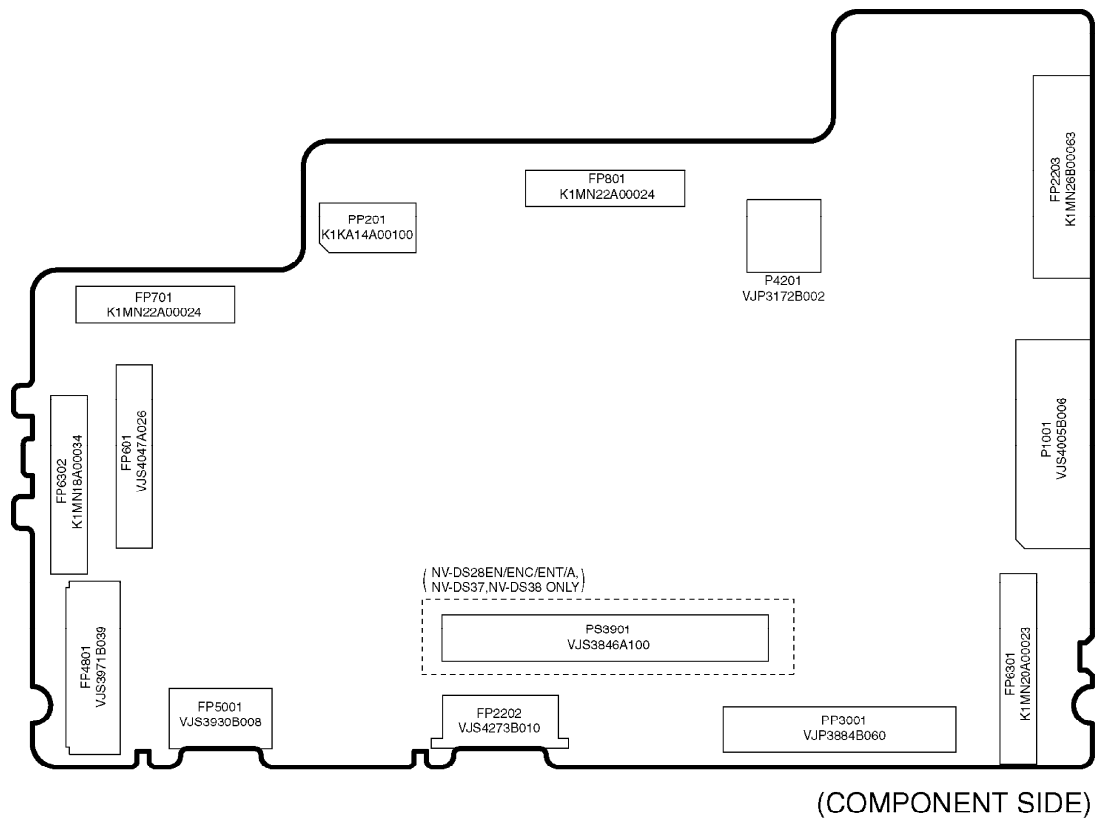
Ref.	Part No.	Pin	Part Name	Connection	Q'ty	Remarks
(1)	VFK1595D1425	14	Flat Cable	PP201(Main) - PS291 (CCD)	1	as NV-DS1
(2)	VFK1282	22	Flat Cable	FP701(Main) - Lens Flex.	1	as NV-DX
(3)	VFK1459	39	Flat Cable	FP4801(Main) - FP4903(Front)	1	as NV-DS7
(4)	VFK1441	8	Flat Cable	FP5001(Main) - Cylinder (Head Amp)	1	as NV-DS7
(5)	VFK1440	10	Flat Cable	FP2202(Main) - Cylinder (Drive)	1	as NV-DS7
(6)	VFK1443	18	Flat Cable	FP6302(Main) - Side Case R	1	as NV-DS7
(7)	VFK1443	18	Flat Cable	FP2201(Main) - Capstain (Drive)	1	as NV-DS7
(8)	VFK1461	20	Flat Cable	FP6301(Main) - Side Case L	1	as NV-DS7
(9)	VFK1492	26	Flat Cable	FP2003(Main) - Mechanism Unit	1	as NV-DS9
(10)	VFK1545	100	Flat Cable	PS3901(Main) - PP3901(DSC/EX IN)	1	as NV-DS1
(11)	VFK1492	26	Flat Cable	FP601 (Main) - Side Case R (Monitor)	1	as NV-DS9
(12)	VFK1282	22	Flat Cable	FP801 (Main) - EVF	1	as NV-DX
(13)	VFK1691	6	Wire Cable	P1001(Main) - Battery Case	1	New

How to use extension cables.

Fig. T1-1



3.3. LOCATION FOR SPARE CONNECTORS OF THE MAIN C.B.A.

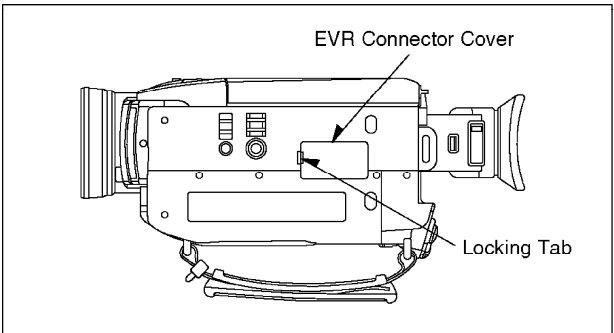


4. PREPARATION FOR ELECTRICAL ADJUSTMENT

1. Unlock the locking tab and remove the EVR connector cover which is located on Battery Catcher Unit as follows.

2. Then connect the following cables as shown in **Fig. E2** .

Fig. E1



Part No.	Part Name	Q'ty	Remarks
VFK1395	232C(M3)/F Cable	1	
VFK1308E	Measuring Board	1	
VFK1309	EVR Connector Board	1	
VFK1317	30 Pin Flat Cable	2	
VJA0941	DC Output Cable	1	For AC Adaptor
VFK1164TARSA	Setup Ring	1	For Collimator
VFK1309EX	Connection Adaptor	1	

Fig. E2

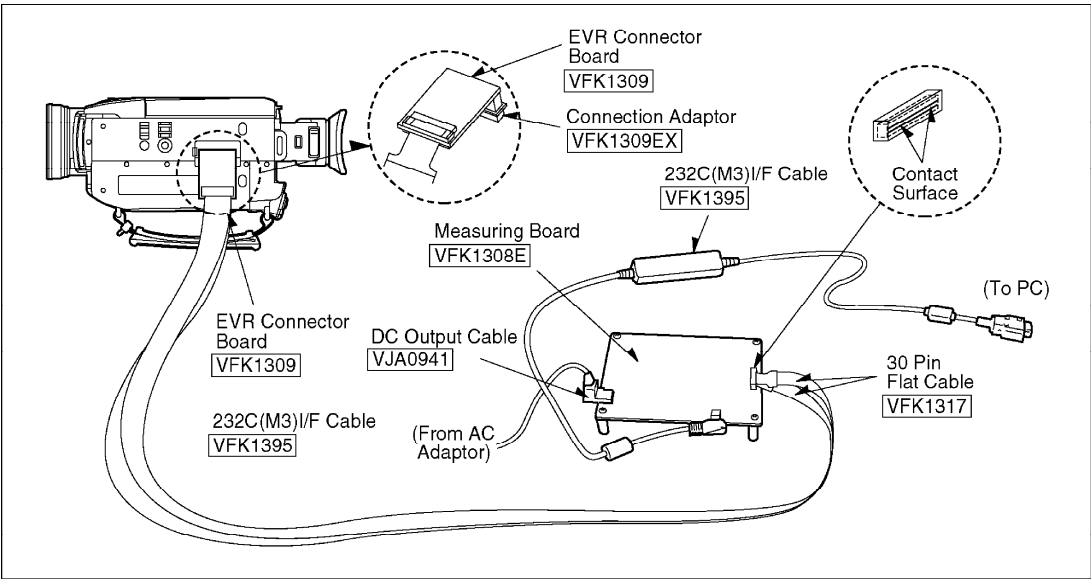
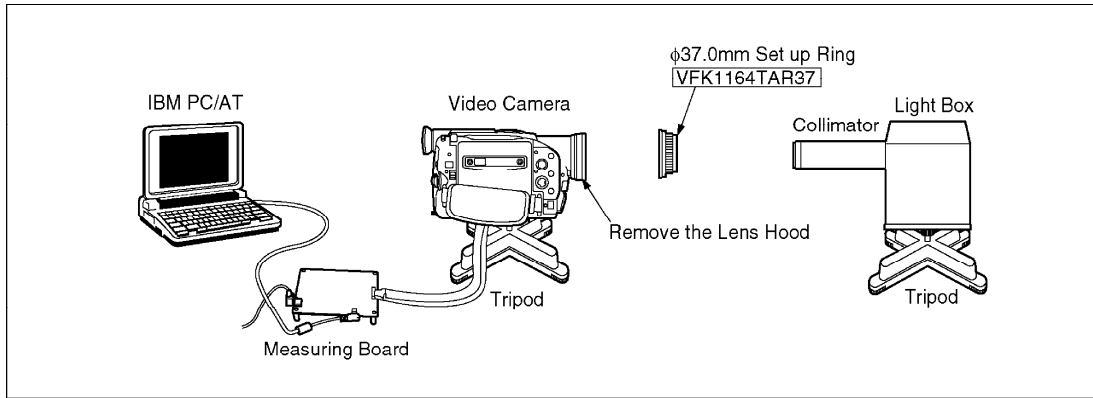


Fig. E3

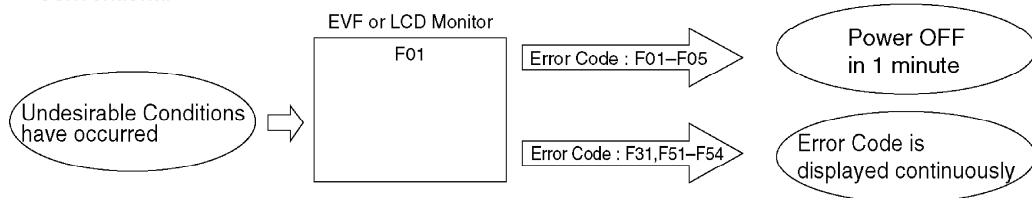


5. SERVICE MODE

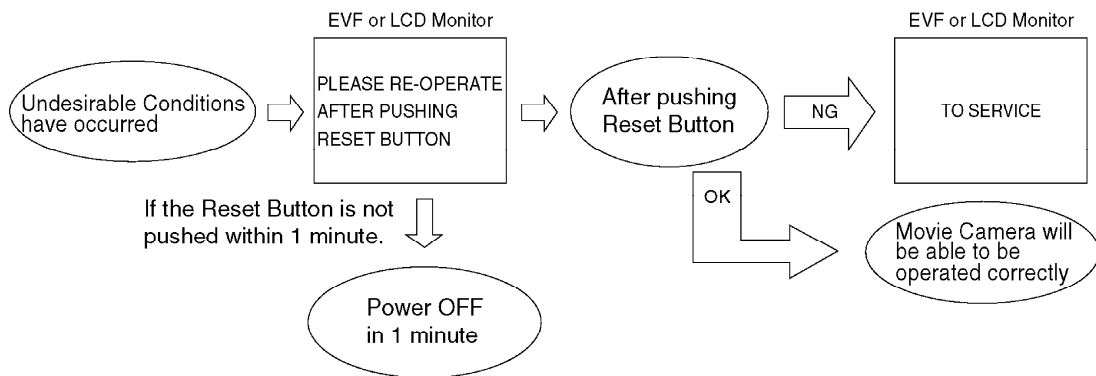
5.1. New Error Code Display

Conventionally, the error code has been displayed automatically on the EVF or LCD Monitor when undesirable conditions have occurred. With the New Error Code Display, the error code has not been displayed automatically as follows except some error codes F31(Data Transmission Error), U10(Dew) and U11(Head Clogging).

< Conventional >



< New >



Note:

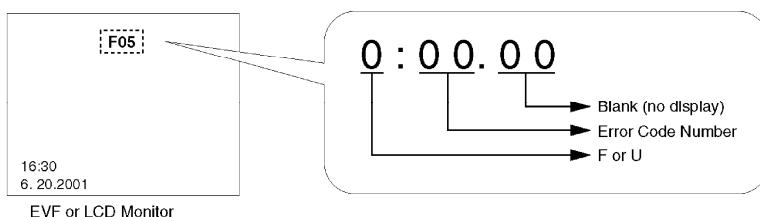
1. The only some error codes F31, U10 and U11 has displayed automatically on the EVF or LCD monitor as usual.
2. The Power LED also has been flashed for 1 min. when undesirable condetions have occurred.(See below)

5.2. Viewing Error Code

When displaying the Error Code on the EVF or LCD Monitor, push the FADE/STOP and REC START/ PAUSE buttons simultaneously for more 3 seconds.

Note:

When the cassette tape is inserted, this operation will not be worked.

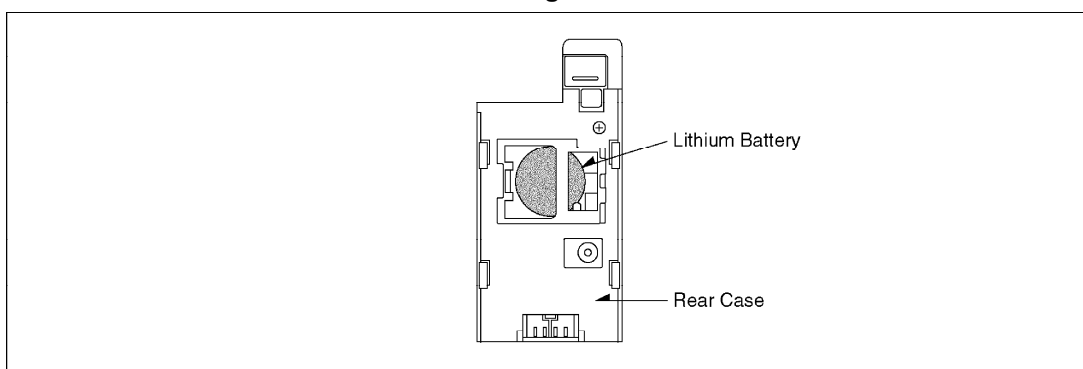


DISPLAY	CONDITION	POWER OFF TIMING / POWER LED FLASHING TIMING
F01	T-Reel Lock	After 1 minute flashing the LED
F02	S-Reel Lock	After 1 minute flashing the LED
F03	Unloading Lock	After 1 minute flashing the LED
F04	Loading Lock	After 1 minute flashing the LED
F05	Cylinder Lock	After 1 minute flashing the LED
F31	Data Transmission Error	Not turning OFF
F51	Focus Motor Lock	Not turning OFF Power LED is flashed at 1 Hz timing
F52	Zoom Motor Lock	Not turning OFF Power LED is flashed at 1 Hz timing
U10	Dew Detection	After 18 seconds flashing the LED Power LED is flashed at 1 Hz timing
U11	Head Clogging	Not turning OFF

6. HOW TO REPLACE THE LITHIUM BATTERY (PROCEDURE)

1. Remove the Power Flex. from Rear Case Unit. (Refer to Disassembly Procedures.)
2. Unsolder the Lithium Battery “ML920S” and then replace the new one. (See Fig. B1 .)

Fig. B1



Note:

The lithium battery is a critical component. (Type No.: CR2025 Manufactured by Panasonic.) It must never be subjected to excessive heat or discharge.

It must therefore only be fitted in equipment designed specifically for its use.

Replacement batteries must be of the same type and manufacture.

They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.

**Do not attempt to re-charge the old battery or re-use it for any other purpose.
It should be disposed of in waste products destined for burial rather than incineration.**

CAUTION Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.
VARNING Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.
ADVARSEL! Lithiumbatteri - Explosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.
VAROITUS Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

7. OPERATING GUIDE

8. ADJUSTMENT PROCEDURES

8.1. DISASSEMBLE FLOW CHART

This flow chart indicates the disassembly steps the cabinet parts, C.B.A. and Mecha. Unit in order to access to be serviced. When reinstalling, perform the steps in the reverse order.

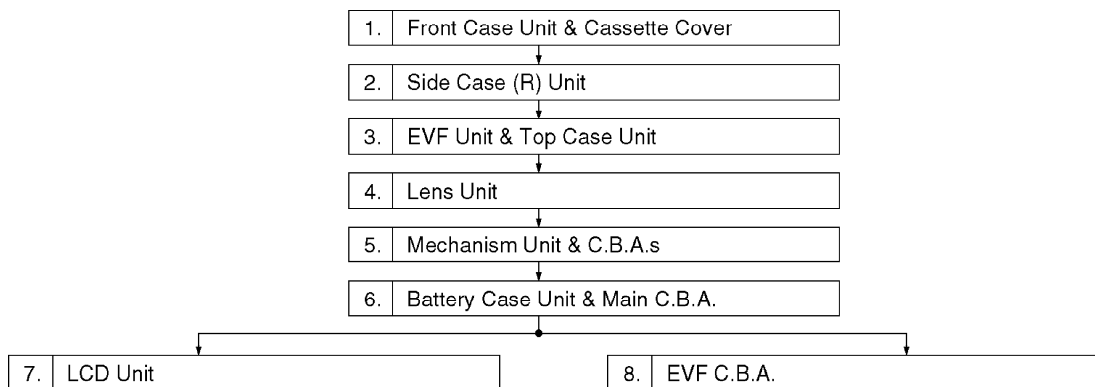
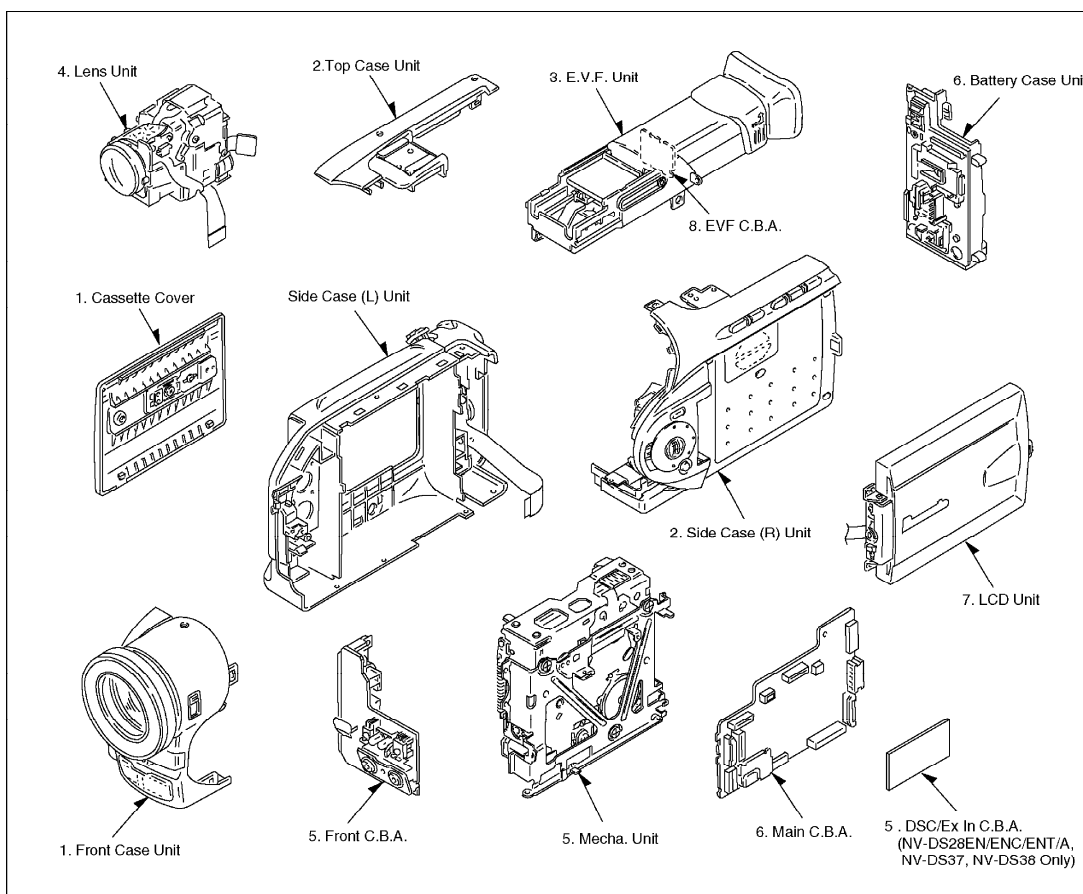


Fig. F1



8.2. DISASSEMBLY PROCEDURES

Flow-Chart for Disassembly Procedure

No.	Item/Part	Fig.	Removal (Screw & Other)
1.	Front Case Unit & Cassette Cover	Fig. 1	6-Screws(A/B/C)
		Fig. 2	5-Screws(D/E/F)
		Fig. 3	6-Screw(G/H/I) Remove Cassette Cover
		Fig. 4	Unlock---(a) Remove the Front Case Unit.
2.	Side Case (R) Unit	Fig. 5	5-Screws(J/K/L)
		Fig. 6	Slide the Side Case (R) Unit. Disconnect the following connectors. FP601/FP6302/P4201/ FP3902 Remove the Side Case (R) Unit.
3.	EVF Unit & Top Case Unit	Fig. 7	1-Screw(M)Disconnect the FP801. Remove the EVF Unit. Remove the Top Case Unit.

No.	Item/Part	Fig.	Removal (Screw & Other)
4.	Lens Unit	Fig. 7	1-Screw(N) Disconnect the FP701/ PP201. Remove the Lens Unit.
5.	Mecha. Unit & Main/ Front/ DSC Ex In (NV- DS28EN/ ENC/ENT/A, DS37, NV- DS38only) C.B.A.s.	Fig. 8	Disconnect the FP4801/ FP6301. Remove the Mecha. Unit & Main C.B.A.. Disconnect the PS3901.Remove the DSC Ex In C.B.A.. Unlock---(b) Remove the Front C.B.A..
6.	Rear Case Unit & Main C.B.A.	Fig. 9	Remove the Battery Case Unit(Disconnect P1001) 1-Screw(O) Disconnect the following connectors. FP5001/FP2203/FP2201/ FP2202 Unlock---(c) Remove the MainC.B.A..
7.	LCD Unit	Fig. 10	2-Screws(P) Unlock---(d) Remove the LCD Case (Upper). Disconnect the FP903. Unlock---(e) Remove the LCD Unit from Side Case (R) Unit.
		Fig. 11	Remove the Back Light Unit,Insulation Sheet and Monitor C.B.A..
8.	EVF C.B.A.	Fig. 12	Remove the EVF Flex. 2-Screws(Q) Remove the EVF Unit.
		Fig. 13	Unlock---(f) Remove the Eye Cap Holder and Eye Cap.
		Fig. 14	Unlock---(g) Remove the EVF Case (Upper) and (Lower).

Fig. 1

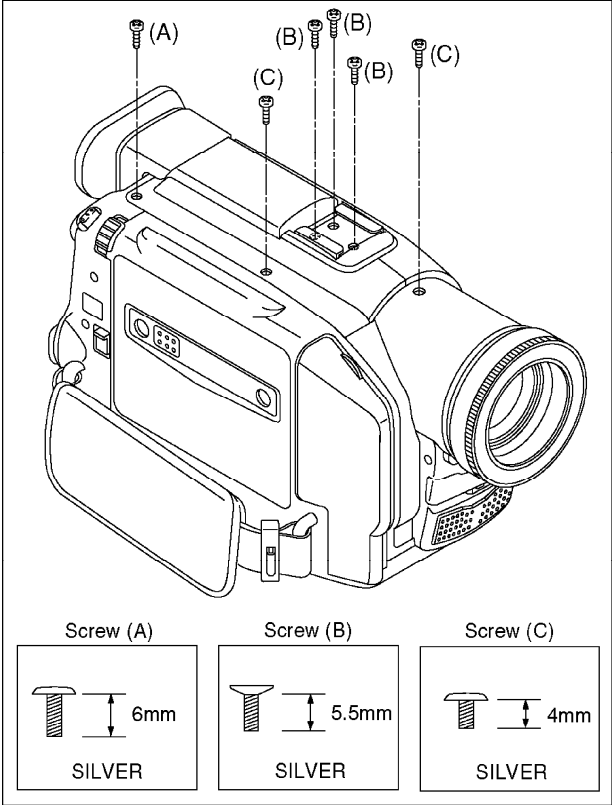


Fig. 2

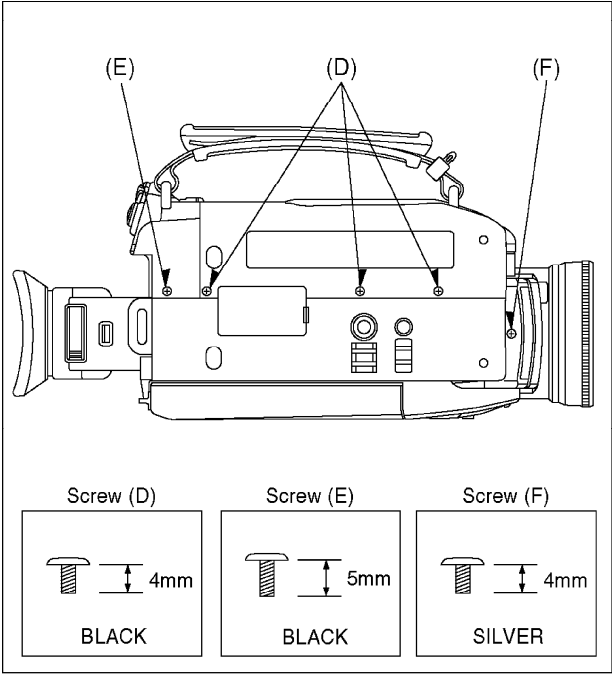


Fig.3

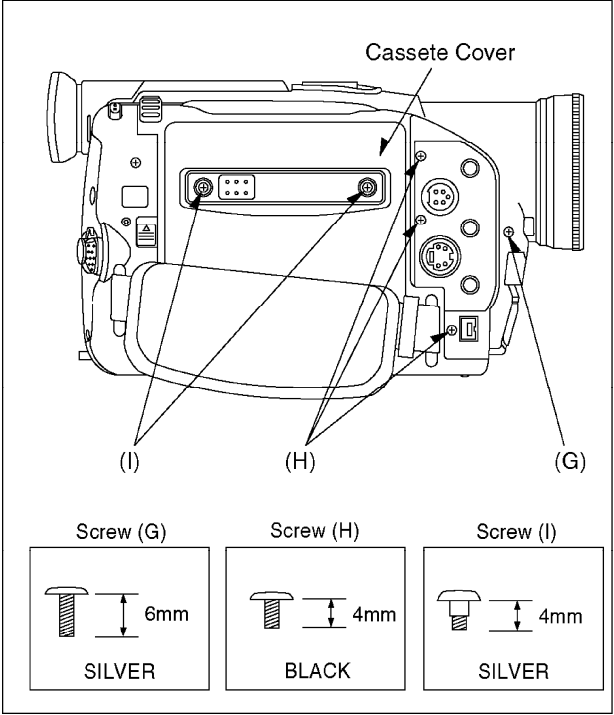


Fig.4

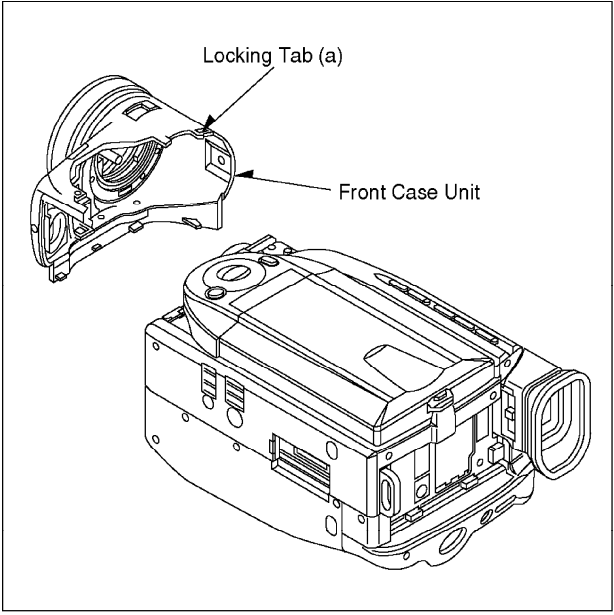


Fig. 5

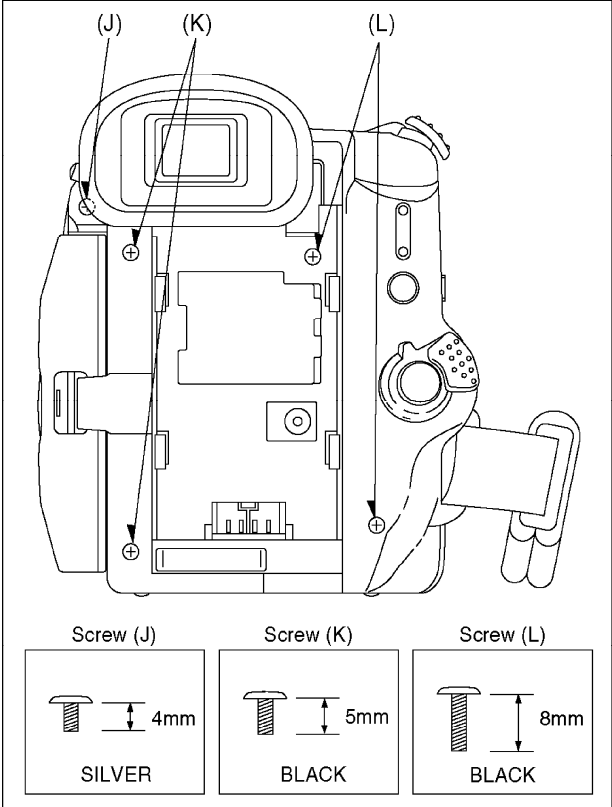


Fig. 6

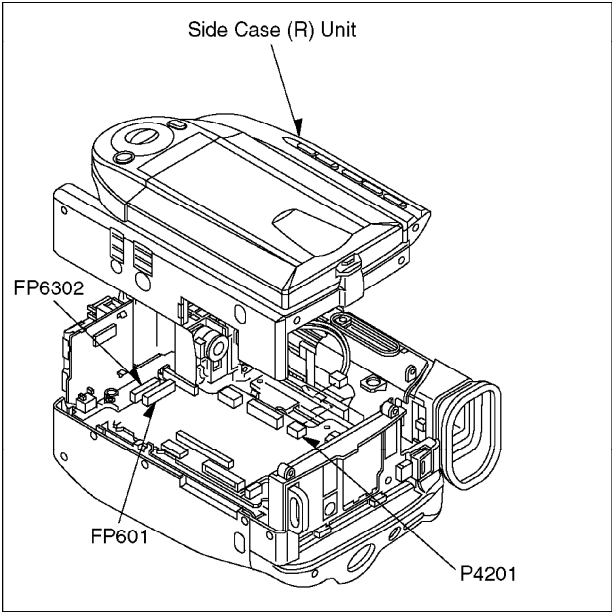


Fig. 7

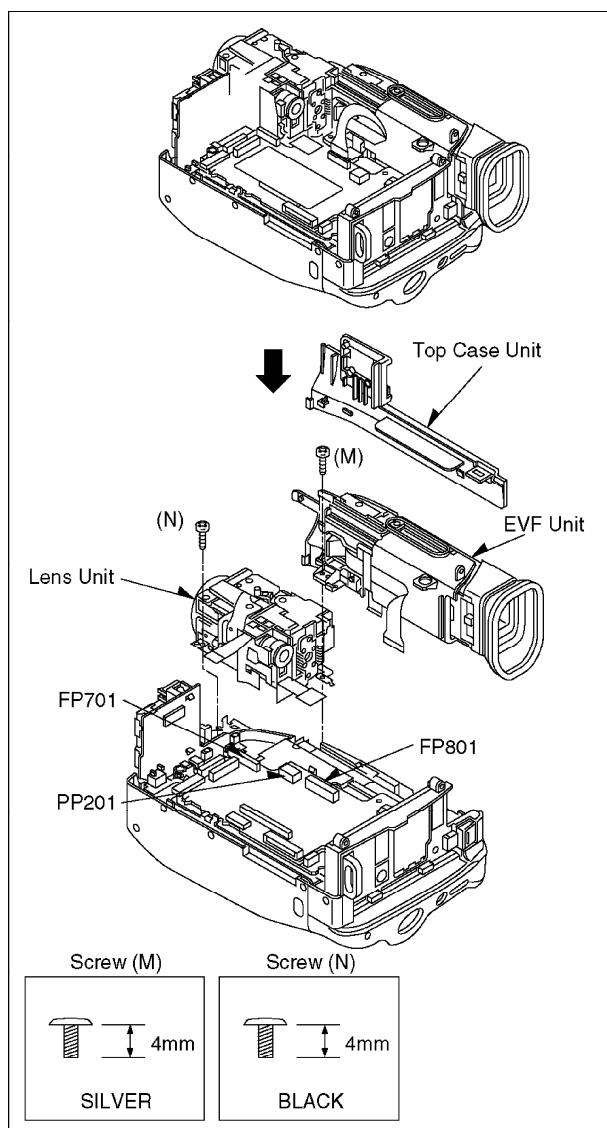


Fig. 8

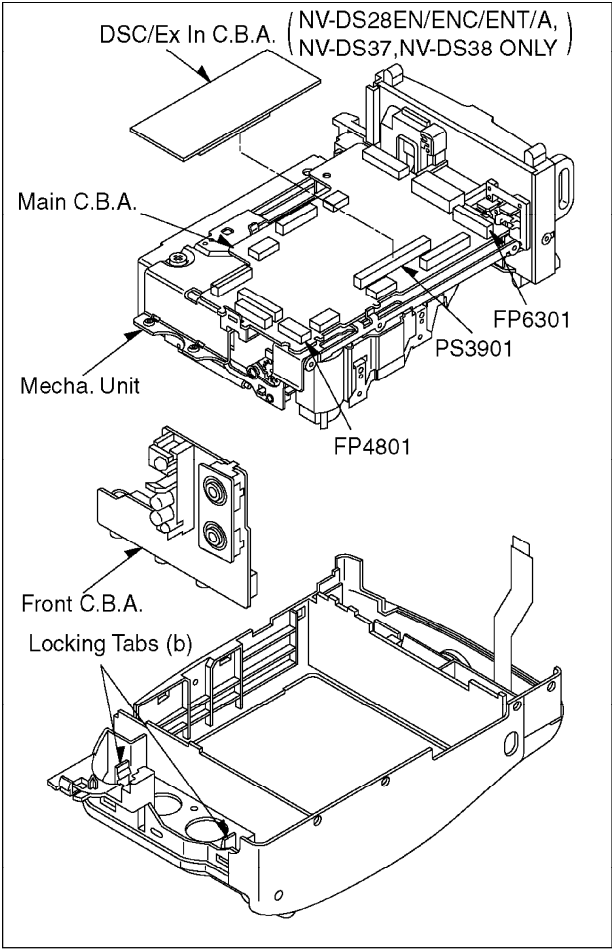


Fig. 9

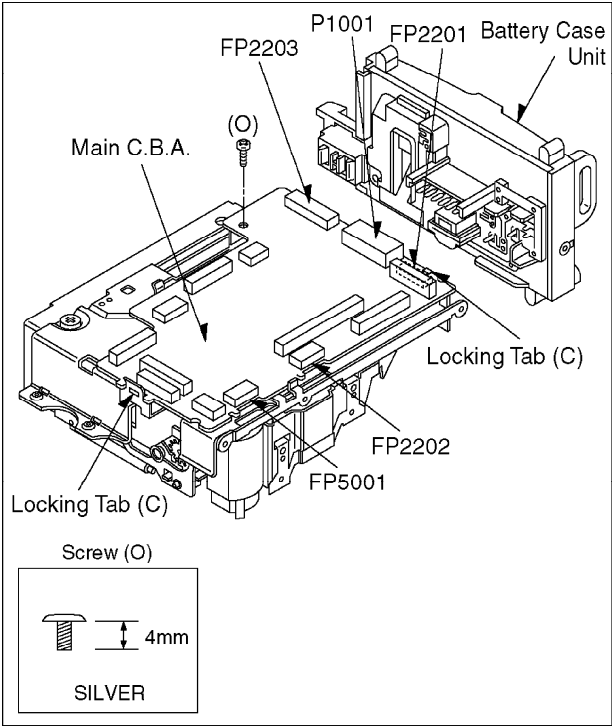


Fig. 10

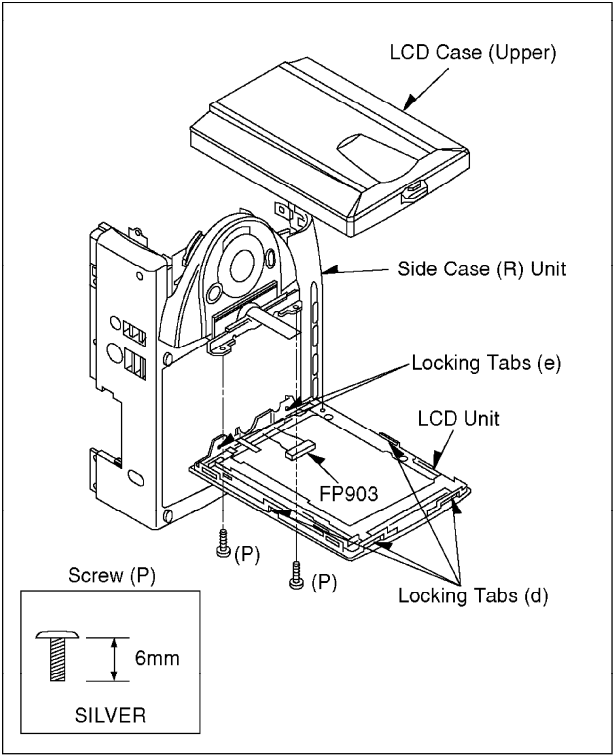


Fig. 11

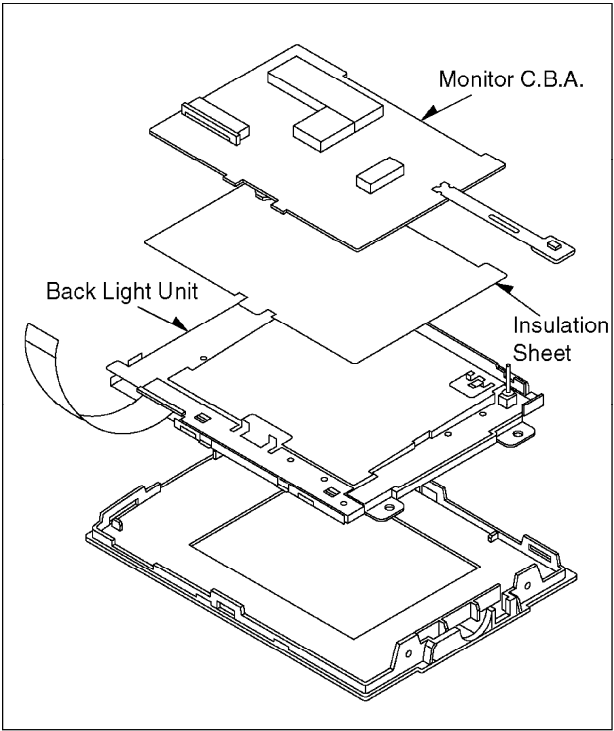


Fig. 12

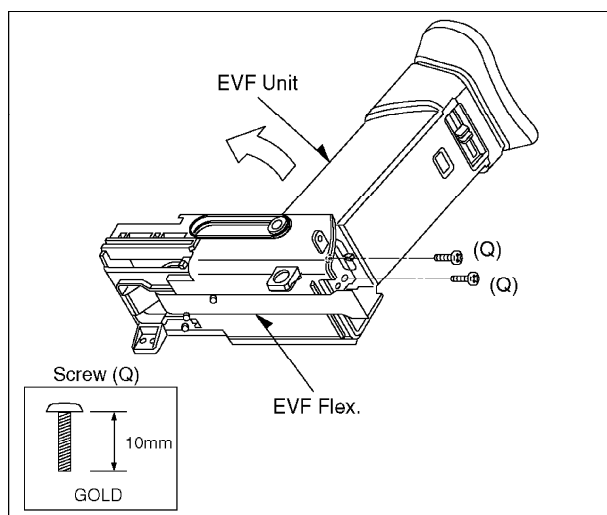


Fig. 13

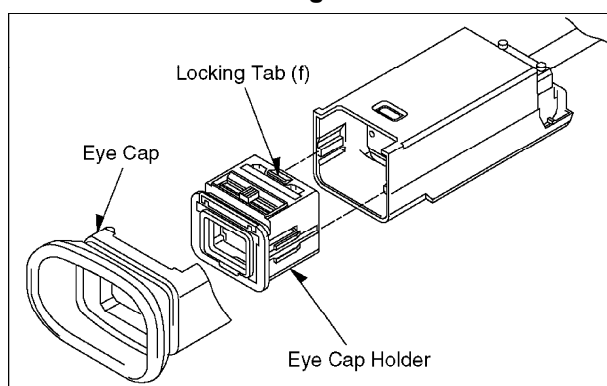
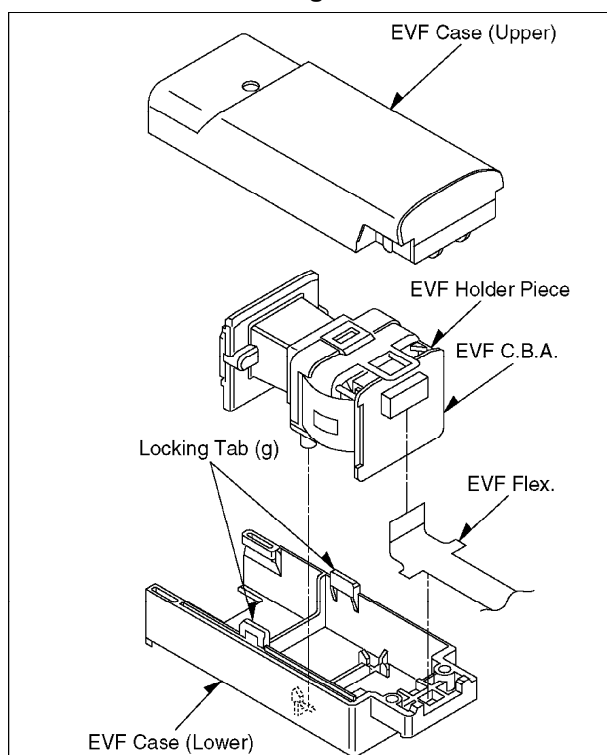


Fig. 14



8.3. DISASSEMBLY PROCEDURES OF CAMERA LENS UNIT

The following flowchart describes order or steps for removing the Camera lens unit and certain

printed circuit boards in order to make access to the item needing service. / To reassemble the unit follow the steps in reverse order.

Fig. L1

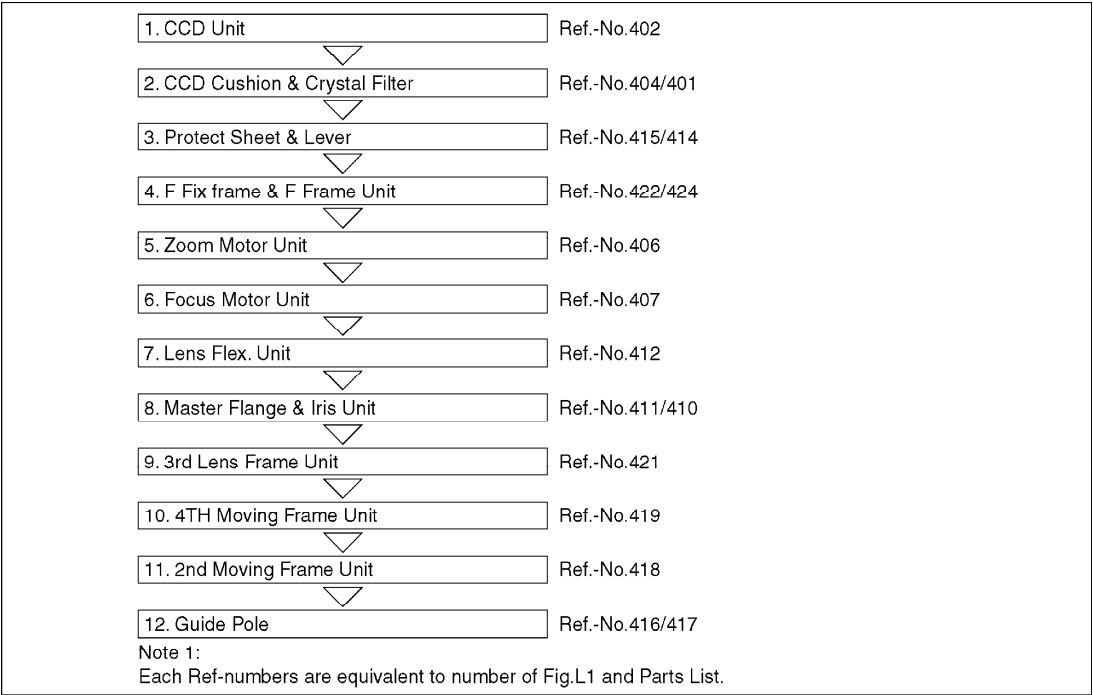
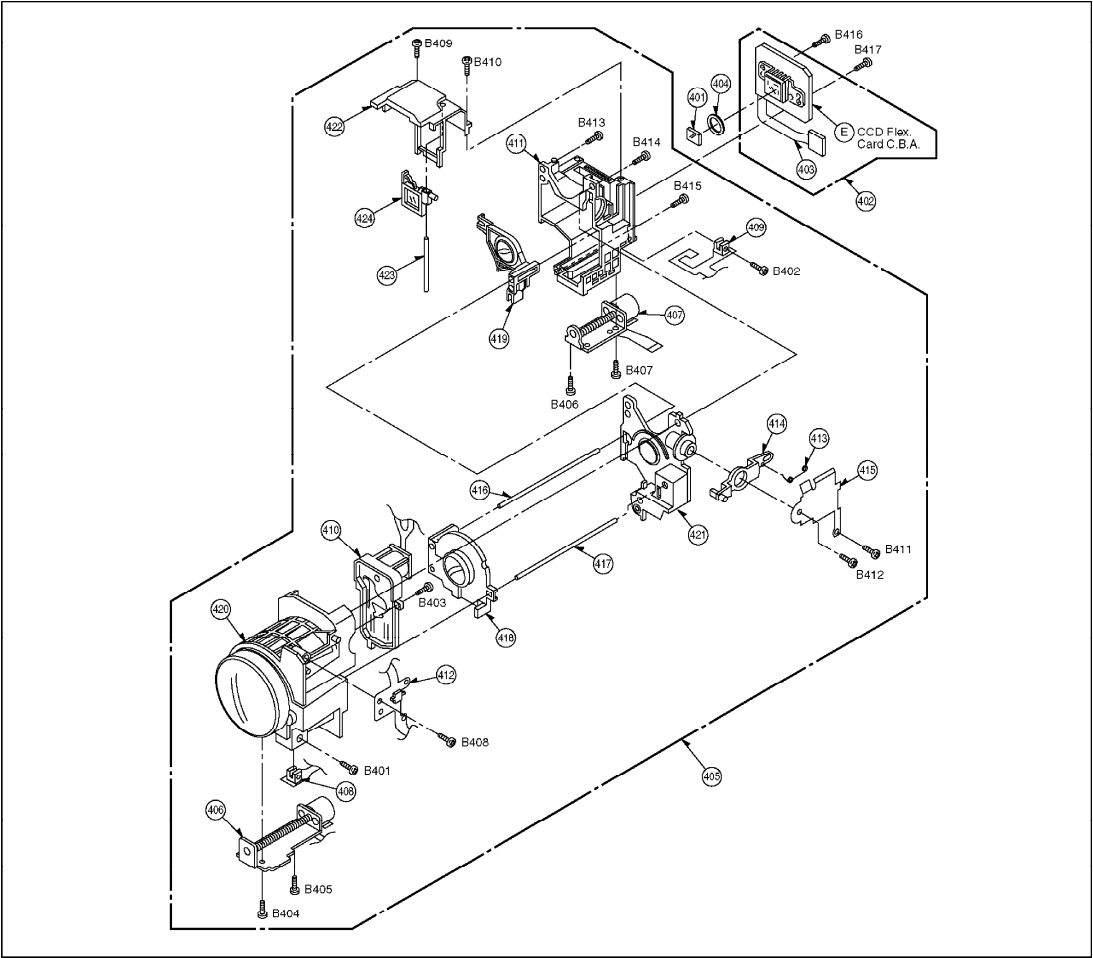


Fig. L2



9. ABBREVIATIONS

10. WAVEFORM TABLE

11. SCHEMATIC DIAGRAMS

11.1. OVERALL SCHEMATIC DIAGRAM

11.2. INTERCONNECTION SCHEMATIC DIAGRAM

11.3. CCD FLEX. CARD SCHEMATIC DIAGRAM

11.4. SIDE CASE L UNIT SCHEMATIC DIAGRAM

11.5. SUDE CASE R UNIT (CAM/VTR OPERATION FLEX.) SCHEMATIC DIAGRAM

11.6. SIDE CASE R UNIT (DSC FLEX.) SCHEMATIC DIAGRAM (NV-DS37, NV-DS38 ONLY)

11.7. FRONT SCHEMATIC DIAGRAM

11.8. MONITOR & HALL SENSOR SCHEMATIC DIAGRAM

11.9. EVF SCHEMATIC DIAGRAM

12. CIRCUIT BOARD ASSEMBLIES

12.1. MONITOR C.B.A.

12.1.1. MONITOR ADDRESS INFORMATION

12.2. CCD FLEX. CARD C.B.A.

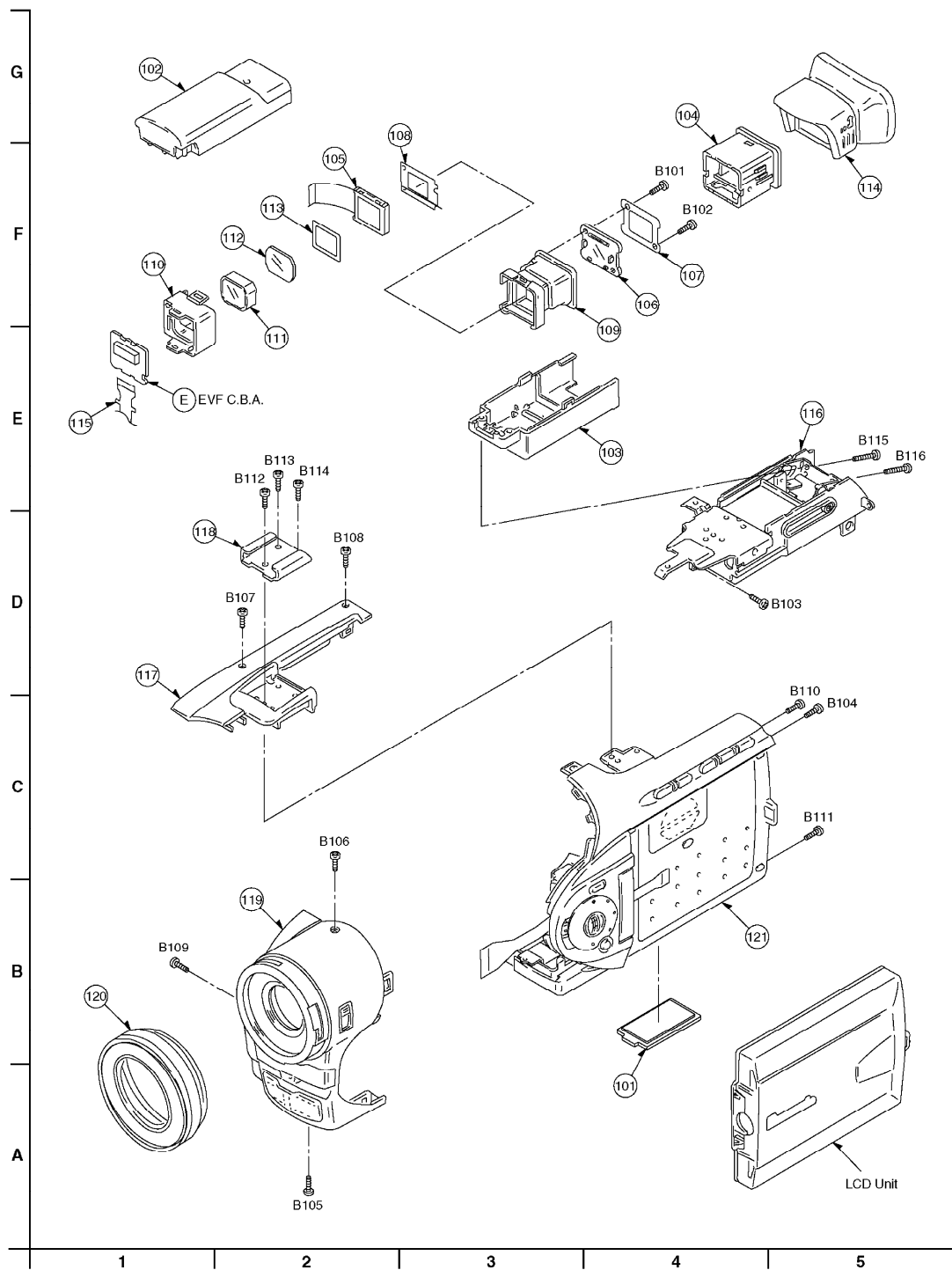
12.3. FRONT C.B.A.

12.3.1. FRONT ADDRESS INFORMATION

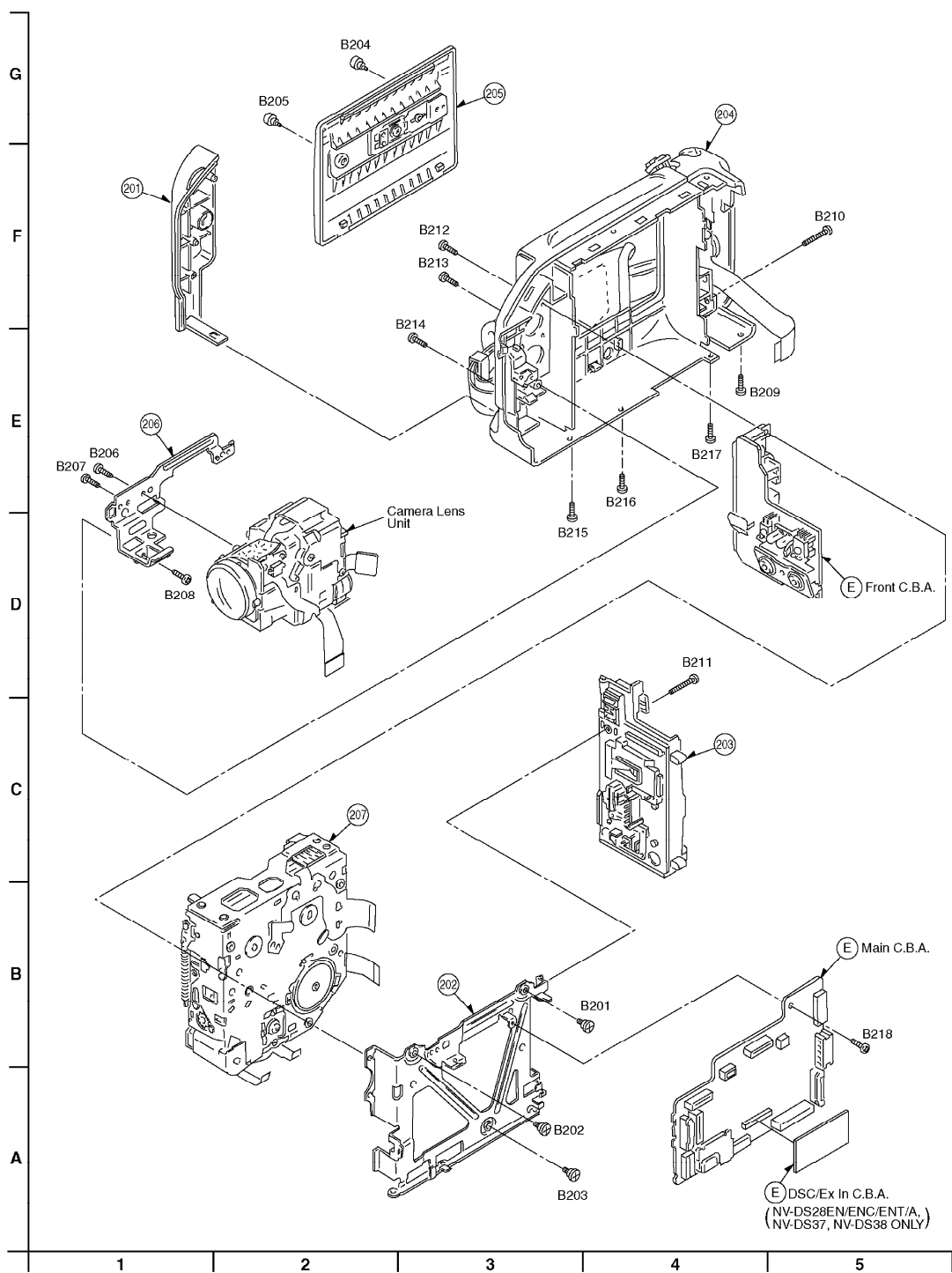
12.3.2. EVF C.B.A.

13. EXPLODED VIEWS

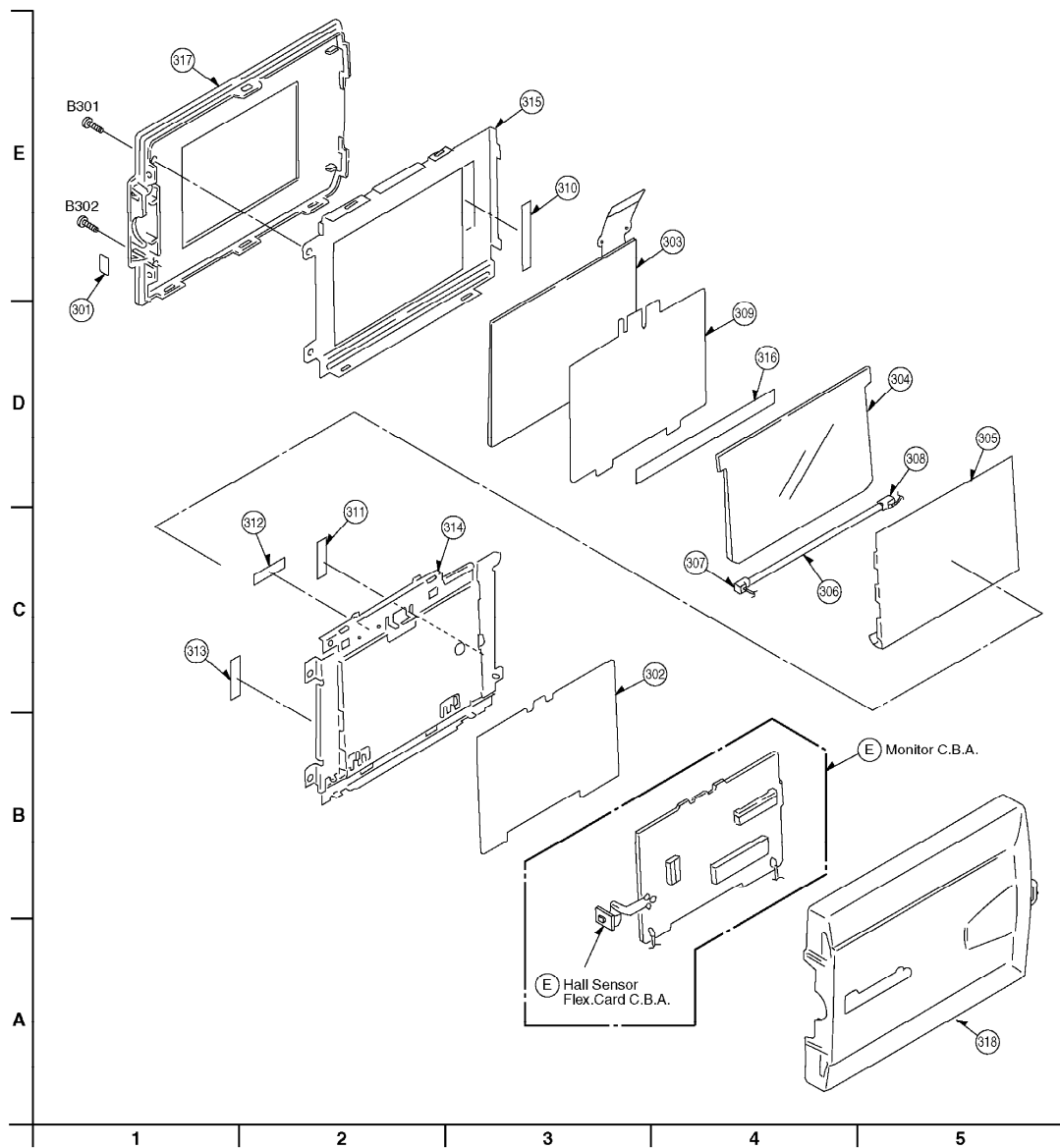
13.1. FRAME & CASING SECTION (1)



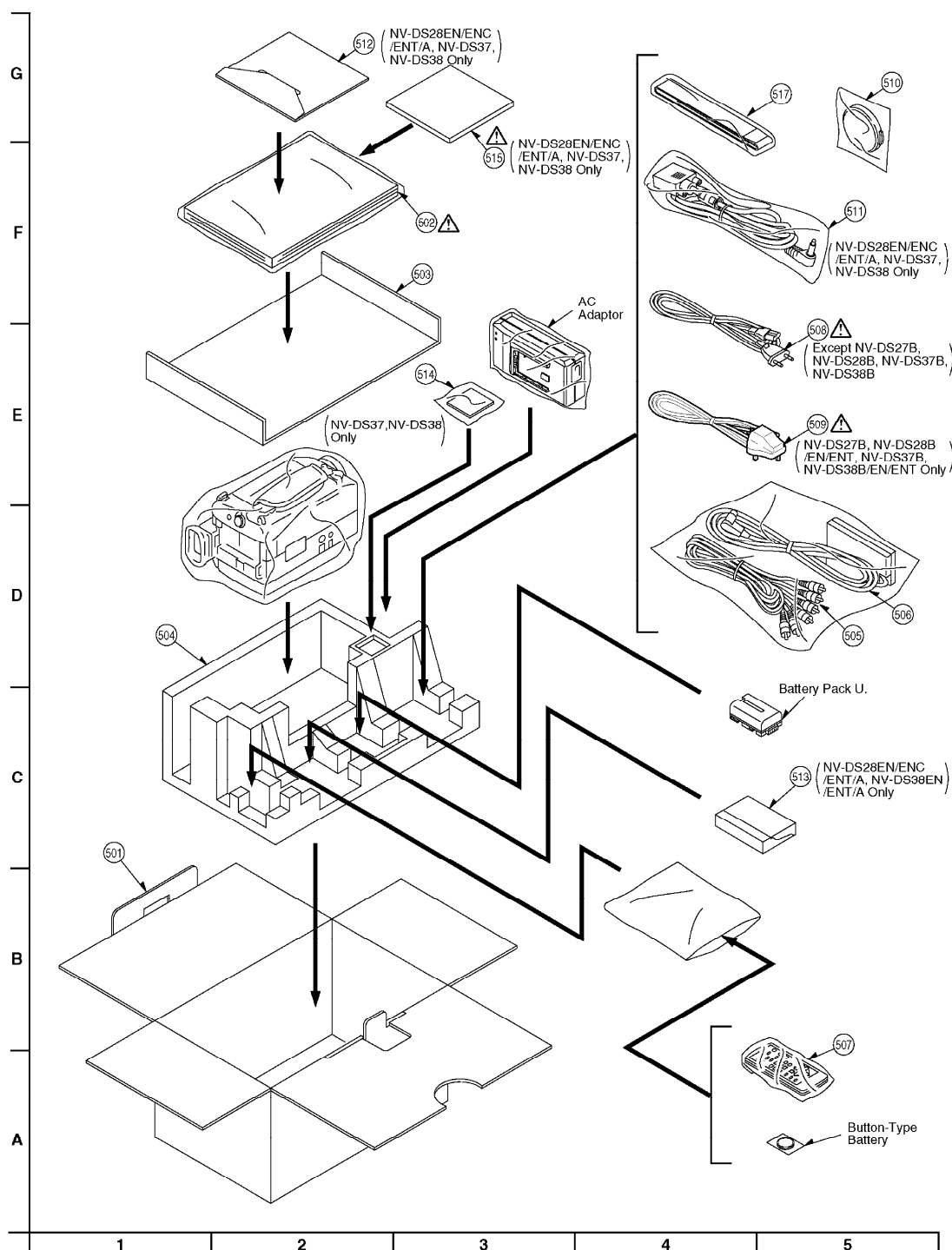
13.2. FRAME & CASING SECTION (2)



13.3. LCD SECTION



13.4. CAMERA LENS SECTION



14. REPLACEMENT PARTS LIST

14.1. FRAME & CASING SECTION (1) PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.

2. IMPORTANT SAFETY NOTICE

Components identified with the mark $\triangle$ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
<u>101</u>	VKF3342	EVR COVER	
<u>102</u>	VYK9973	EVF CASE (UPPER)	
<u>103</u>	VKM5571	EVF CASE (LOWER)	
<u>104</u>	VYQ2165	EVF VIEW ADJ. U.	
<u>105</u>	L5EDDXH00005	EVF LCD PANEL	
<u>106</u>	VGQ5492	EVF PROTECT SHEET	
<u>107</u>	VGQ6265	PROTECT COVER SHEET	
<u>108</u>	VGQ6143	LCD MASK	
<u>109</u>	VJF1422	LCD HOLD PIECE	
<u>110</u>	VJF1423	LCD HOLD COVER	
<u>111</u>	LSFL0039	LED LENS	
<u>112</u>	LSFL0040	LED DIFFUSION SHEET	
<u>113</u>	VGQ6172	EVF PROTECT TAPE	
<u>114</u>	VMG1383	EYE CAP	
<u>115</u>	VWJ1470	EVF FLEX.	
<u>116</u>	VYK9863	EVF SLIDE CASE U.	
<u>117</u>	VKM5569	TOP CASE	
<u>118</u>	VMP6786	ACCESSORY SHOE	
<u>119</u>	VYK9861	FRONT CASE U.	
<u>120</u>	VYF2765	LENS HOOD U.	
<u>121</u>	N9ZZ00000094	SIDE CASE (R) (1) U.	NV-DS27 NV-DS28
<u>121</u>	N9ZZ00000097	SIDE CASE (R) (1) U.	NV-DS37 NV-DS38
<u>B101</u>	VHD1303	SCREW	
<u>B102</u>	VHD1303	SCREW	
<u>B103</u>	XQN16+B4FN	SCREW	
<u>B104</u>	XQN16+B4FN	SCREW	
<u>B105</u>	XQN16+B4FN	SCREW	
<u>B106</u>	XQN16+B4FN	SCREW	
<u>B107</u>	XQN16+B4FN	SCREW	
<u>B108</u>	XQN16+BJ6FN	SCREW	
<u>B109</u>	XQN16+BJ6FN	SCREW	
<u>B110</u>	XQN16+BJ5FZ	SCREW	
<u>B111</u>	XQN16+BJ5FZ	SCREW	
<u>B112</u>	XQS2+A55FN	SCREW	
<u>B113</u>	XQS2+A55FN	SCREW	
<u>B114</u>	XQS2+A55FN	SCREW	
<u>B115</u>	XQN2+BJ10FN	SCREW	
<u>B116</u>	XQN2+BJ10FN	SCREW	

14.2. FRAME & CASING SECTION (2) PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
<u>201</u>	VKF3343	JACK COVER	
<u>202</u>	VYQ2164	MECHA. FRAME U.	
<u>203</u>	K4BZ06Z00001	BATTERY CASE U.	
<u>204</u>	N9ZZ00000089	SIDE CASE (L) U.	NV-DS27,NV-DS28EG/EGM/B
<u>204</u>	N9ZZ00000099	SIDE CASE (L) U.	NV-DS28EN/ENC/ENT/A
<u>204</u>	N9ZZ00000092	SIDE CASE (L) U.	NV-DS37
<u>204</u>	N9ZZ00000100	SIDE CASE (L) U.	NV-DS38
<u>205</u>	VYK9864	CASSETTE COVER U.	
<u>206</u>	VMP6787	LENS FRAME	
<u>207</u>	VXY1629	MECHA. CHASSIS	(RTL)
<u>B201</u>	VHD1422	SCREW	
<u>B202</u>	VHD1422	SCREW	
<u>B203</u>	VHD1422	SCREW	
<u>B204</u>	VHD1421	SCREW	
<u>B205</u>	VHD1421	SCREW	
<u>B206</u>	XQN16+BJ4FZ	SCREW	
<u>B207</u>	XQN16+BJ4FZ	SCREW	
<u>B208</u>	XQN16+BJ4FZ	SCREW	
<u>B209</u>	XQN16+BJ5FZ	SCREW	
<u>B210</u>	XQN16+BJ8FZ	SCREW	
<u>B211</u>	XQN16+BJ8FZ	SCREW	
<u>B212</u>	XQN16+B4FZ	SCREW	
<u>B213</u>	XQN16+B4FZ	SCREW	
<u>B214</u>	XQN16+B4FZ	SCREW	
<u>B215</u>	XQN16+B4FZ	SCREW	
<u>B216</u>	XQN16+B4FZ	SCREW	
<u>B217</u>	XQN16+B4FZ	SCREW	
<u>B218</u>	XQN16+B4FN	SCREW	

14.3. LCD SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
<u>301</u>	VGQ6171	PROTECT SHEET	
<u>302</u>	VGQ6181	LCD INSULATION SHEET	
<u>303</u>	EDTCA29QJ0	MONITOR LCD PANEL	
<u>304</u>	VKW2909	LIGHT GUIDE PLATE	
<u>305</u>	VGL0929	REFLECTION SHEET	
<u>306</u>	KC56D1889DH	FLUORESCENCE TUBE	
<u>307</u>	VGQ6138	FLUORESCENCE TUBE RUBBER	
<u>308</u>	VGQ6138	FLUORESCENCE TUBE RUBBER	
<u>309</u>	VGL0927	DIFFUSION SHEET	
<u>310</u>	VGQ5810	MF INSULATION SHEET	
<u>311</u>	VGQ6170	LCD PANEL FIXING SHEET	
<u>312</u>	VGQ6170	LCD PANEL FIXING SHEET	
<u>313</u>	VGQ6170	LCD PANEL FIXING SHEET	
<u>314</u>	VSC5206	LCD FRAME	
<u>315</u>	VSC5211	LCD SHIELD CASE	
<u>316</u>	VGQ6272	LCD LIGHT INSULATION BARRIER	
<u>317</u>	VKM5568	LCD CASE (LOWER)	
<u>318</u>	VYK9866	LCD CASE (UPPER) U.	NV-DS27
318	VYK9875	LCD CASE (UPPER) U.	NV-DS28EG/EGM/B
318	VYK9935	LCD CASE (UPPER) U.	NV-DS28EN/ENC/ENT/A
318	VYK9929	LCD CASE (UPPER) U.	NV-DS37
318	VYK9930	LCD CASE (UPPER) U.	NV-DS38EG/EGM/B
318	VYK9975	LCD CASE (UPPER) U.	NV-DS38EN/ENT/A
<u>B301</u>	XQN16+BJ6FN	SCREW	
<u>B302</u>	XQN16+BJ6FN	SCREW	

14.4. CAMERA LENS SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
<u>401</u>	VDL1193	CRYSTAL FILTER	
<u>402</u>	VEK9291	CCD U.	
<u>403</u>	VJB22308	CCD FLEX.	
<u>404</u>	VMX3070	CCD CUSHION	
<u>405</u>	VXW0498	LENS U.	
<u>406</u>	10S1F10F6NF	ZOOM MOTOR U.	
<u>407</u>	10S1F10F7NF	FOCUS MOTOR U.	
<u>408</u>	CNA1302KR0SL	PHOTOSENSOR	
<u>409</u>	CNA1302KR0SL	PHOTOSENSOR	
<u>410</u>	L9ZZ00000184	IRIS U.	
<u>411</u>	VDW0740	MASTER FLANGE	
<u>412</u>	VEK9290	LENS FLEX. U.	
<u>413</u>	VMB3504	F SPRING	
<u>414</u>	VML3592	LEVER	
<u>415</u>	VMP6769	PROTECT SHEET	
<u>416</u>	VMS6943	GUIDE POLE	
<u>417</u>	VMS6943	GUIDE POLE	
<u>418</u>	VXP2122	2ND MOVING FRAME U.	
<u>419</u>	VXP2124	4TH MOVING FRAME U.	
<u>420</u>	VXQ1010	MAIN FRAME U.	
<u>421</u>	VXQ1011	3RD MOVING FRAME U.	
<u>422</u>	VDW0742	F FIX FRAME	
<u>423</u>	VMS6838	F GUIDE POLE	
Ref. No.	Part No.	Part Name & Description	Remarks
<u>424</u>	VXQ1012	F FRAME U.	
<u>B401</u>	VHD0852	SCREW	
<u>B402</u>	VHD0852	SCREW	
<u>B403</u>	XQN16+CJ5	SCREW	
<u>B404</u>	XQN16+CJ5	SCREW	
<u>B405</u>	XQN16+CJ5	SCREW	
<u>B406</u>	XQN16+CJ5	SCREW	
<u>B407</u>	XQN16+CJ5	SCREW	
<u>B408</u>	XQN16+CJ5	SCREW	
<u>B409</u>	XQN16+CJ5	SCREW	
<u>B410</u>	XQN16+CJ5	SCREW	
<u>B411</u>	XQN16+CJ5	SCREW	
<u>B412</u>	XQN16+CJ5	SCREW	
<u>B413</u>	XQN16+CJ8	SCREW	
<u>B414</u>	XQN16+CJ8	SCREW	
<u>B415</u>	XQN16+CJ8	SCREW	
<u>B416</u>	XQN16+CJ6	SCREW	
<u>B417</u>	XQN16+CJ6	SCREW	

14.5. PACKING PARTS & ACCESSORIES SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	
501	VPJ0J67	PACKING	NV-DS27E
501	VPJ0J87	PACKING	NV-DS27E
501	VPJ0J84	PACKING	NV-DS27E
501	VPJ0J83	PACKING	NV-DS28E
501	VPJ0J85	PACKING	NV-DS28E
501	VPJ0J88	PACKING	NV-DS28E
501	VPJ0J68	PACKING	NV-DS28E
501	VPJ0K76	PACKING	NV-DS37E
501	VPJ0K77	PACKING	NV-DS37E
501	VPJ0K78	PACKING	NV-DS37E
501	VPJ0K79	PACKING	NV-DS38E
501	VPJ0K80	PACKING	NV-DS38E
501	VPJ0K81	PACKING	NV-DS38E
501	VPJ0K82	PACKING	NV-DS38E
502	VQT9150	OPERATING INSTRUCTIONS(GERMAN,FRENCH,ITALIAN,DUTCH)	▲ NV-DS
502	VQT9154	OPERATING INSTRUCTIONS(ENGLISH)	▲ NV-DS
502	VQT9196	OPERATING INSTRUCTIONS(ENGLISH,CZECH,POLISH,HUNGARIANS)	▲ NV-DS
502	VQT9152	OPERATING INSTRUCTIONS(GERMAN,SPANISH,SWEDISH,DANISH)	▲ NV-DS DS38EGM
502	VQT9155	OPERATING INSTRUCTIONS(ENGLISH,CHINESE,RUSSIAN,ARABIC)	▲ NV-DS
502	VQT9371	OPERATING INSTRUCTIONS(ENGLISH)	▲ NV-DS
503	VPN5399	SPACER PAD	
504	VPN5548	CUSHION	
505	K2KC4CB00002	AV CABLE	
506	K2GJ2DC00004	DC CABLE	
507	N2QAEC000003	REMOTE CONTROLLER	
508	VJA0664	AC CORD	▲ NV-DS ENT,NV-D K2CR2DA
508	VJA0754	AC CORD	▲ NV-DS
509	VJA0940	AC CORD	▲ NV-DS EN/ENT
510	VYF2764	HOOD CAP U.	
511	VJA1122	INTERFACE CABLE	NV-DS28E K1V208A1
512	VFF0105	CD ROM FOR PC KIT	NV-DS28E
512	VFF0079	CD ROM FOR PC KIT	NV-DS37,I
513	VFK1451	HEAD CLEANER	NV-DS28E
514	RP-SD008MVE0	SD CARD	NV-DS37,I
515	VQT9193	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ ENGLISH, CHINESE, RUSSIAN)	▲ NV-DS
515	VQT9191	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ GERMAN, FRENCH, ITALIAN, DUTCH)	▲ NV-DS
515	VQT9192	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ GERMAN, SPANISH, SWEDISH, DANISH)	▲ NV-DS
515	VQT9365	OPERATING INSTRUCTIONS FOR PC KIT (CD-ROM/ ENGLISH)	▲ NV-DS
517	VFC3299-A	SHOULDER BELT	

14.6. ELECTRICAL REPLACEMENT PARTS LIST

Note: 1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE: Components identified with the mark Δ have the special characteristics for safety. When replacing any of these components, use only the same type.
3. Unless otherwise specified,
All resistors are in OHMS, K=1,000 OHMS. All capacitors are in MICROFARADS (uF), P=uuF.
4. The P.C. Board units marked with "■" show below the main assembled parts.
5. The marking (RTL) indicates the retention time is limited for this item.
After the discontinuation of this assembly in production, it will no longer be available.

Ref. No.	Part No.	Part Name & Description	Remarks
Ref.No	Part No	Part Name & Description	Remarks
■	VEP03F85A	MAIN C.B.A.	(RTL)NV-DS27EG/EGM/EGE/B,NV-DS28EG/EGM/B
■	VEP03F85B	MAIN C.B.A.	(RTL)NV-DS28EN/ENC/ENT/A
■	VEP03F85C	MAIN C.B.A.	(RTL)NV-DS37EG/EGM/B
■	VEP03F85D	MAIN C.B.A.	(RTL)NV-DS38EG/EGM/B/EN/ENT/A
■	VEP03F86A	DSC/EX IN C.B.A.	NV-DS28EN/ENC/ENT/A
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP03F86B	DSC/EX IN C.B.A.	NV-DS37EG/EGM/B
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP03F86C	DSC/EX IN C.B.A.	NV-DS38EG/EGM/B/EN/ENT/A
			THE COMPONENT PARTS IN THIS C.B.A. ARE NOT SUPPLIED.(SEE INTRODUCTION PAGE IN THIS MANUAL)
■	VEP04773A	FRONT C.B.A.	
■	VEP28284A	EVF C.B.A.	(RTL)
■	VEP26254A	MONITOR C.B.A.	(RTL)INCLUDING THE HALL SENSOR C.B.A.(VEP06E18A).
■	VEP06E18A	HALL SENSOR C.B.A.	(RTL)INCLUDED IN MONITOR C.B.A.(VEP26254A)
■	VEP22308A	CCD FLEX.CARD C.B.A.	(RTL)
■	VEK9290	LENS FLEX.CARD C.B.A.	(RTL)
■	VEP04773A	FRONT C.B.A.	
C491	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C492	ECUX0J474KBV	C.CAPACITOR CH 6.3V 0.47U	
C2803	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2804	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2805	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	

Ref. No.	Part No.	Part Name & Description	Remarks
C2807	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C2810	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4501	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C4502	ECST0JY226Z	T.CAPACITOR CH 6.3V 22U	
C4801	ECUX1C183KBV	C.CAPACITOR CH 16V 0.018U	
C4802	ECUX1C183KBV	C.CAPACITOR CH 16V 0.018U	
C4803	ECUX1C223KBV	C.CAPACITOR CH 16V 0.022U	
C4804	ECUX1C223KBV	C.CAPACITOR CH 16V 0.022U	
C4805	ECUX1H103KBV	C.CAPACITOR CH 50V 0.01U	
C4806	ECUX1H103KBV	C.CAPACITOR CH 50V 0.01U	
C4901	ECUX1H222KBV	C.CAPACITOR CH 50V 2200P	
C4902	ECUX1H222KBV	C.CAPACITOR CH 50V 2200P	
C4903	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4905	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4906	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C4907	ECUX1H472KBV	C.CAPACITOR CH 50V 4700P	
C4908	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4910	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4911	VCEV0JHY470R	E.CAPACITOR CH 6.3V 47U	F2H0J470A003
C4913	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C4950	ECUX1H472KBV	C.CAPACITOR CH 50V 4700P	
C6401	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C6402	F3F0J1060005	TANTALUM CAPACITOR	
D491	MA132WA	DIODE	
D2802	MA2S728	DIODE	
D4501	02DZ6.2YTPH3	DIODE	B0BC6R100014
D4502	02DZ6.2YTPH3	DIODE	B0BC6R100014
D4503	02DZ6.2YTPH3	DIODE	B0BC6R100014
D6801	CL170UR-CD	CHIP LED	
D6802	PH310	DIODE	
D6803	SLR738AV50AC	LED	B3EA00000029
D6804	SLR738AV50AC	LED	B3EA00000029
FP4903	VJS3971B039	CONNECTOR (FEMALE) 39P	
IC2801	C0ZBZ0000540	IC	
IR6401	PNA4611M05VT	IR RECEIVER	
JK2501	K4BZ25B00001	JACK UNIT	
JK4502	VJJ0568	RCA JACK	
L4501	VLQ0855M4R7	COIL 4.7UH	G1C4R7M00016
LB4901	J0JCC0000164	FILTER	
LB4905	VLP0335	COIL	J0JBC0000013
LB4906	VLP0335	COIL	J0JBC0000013
Q491	2SD1030	TRANSISTOR	
Q492	2SD1819A-R	TRANSISTOR	
Q4801	2SD1819A-R	TRANSISTOR	
Q4802	2SD1819A-R	TRANSISTOR	
Q4901	2SD1819A-R	TRANSISTOR	
Q4902	2SB1218A	TRANSISTOR	
Q4903	2SD1819A-R	TRANSISTOR	
Q4904	2SB1218A	TRANSISTOR	



Ref. No.	Part No.	Part Name & Description	Remarks
Q4905	2SD1819A-R	TRANSISTOR	
Q4906	2SD1819A-R	TRANSISTOR	
Q4907	2SD1819A-R	TRANSISTOR	
R491	ERJ3GEYJ225	M.RESISTOR CH 1/16W 2.2K	
R492	ERJ3GEYJ334	M.RESISTOR CH 1/16W 330K	
R493	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R494	ERJ3GEYJ182	M.RESISTOR CH 1/16W 1.8K	
R495	ERJ3GEYJ106	M.RESISTOR CH 1/16W 10M	
R2501	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R2801	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R2802	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R2808	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R4505	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4507	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4801	ERJ6GEYJ392	M.RESISTOR CH 1/10W 3.9K	
R4802	ERJ6GEYJ392	M.RESISTOR CH 1/10W 3.9K	
R4803	ERJ3GEYJ563	M.RESISTOR CH 1/16W 56K	
R4804	ERJ3GEYJ563	M.RESISTOR CH 1/16W 56K	
R4805	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R4806	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R4807	ERJ3GEYJ332	M.RESISTOR CH 1/16W 3.3K	
R4808	ERJ3GEYJ332	M.RESISTOR CH 1/16W 3.3K	
R4809	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R4810	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R4811	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R4812	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R4901	ERJ3GEYJ682	M.RESISTOR CH 1/16W 6.8K	
R4902	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R4903	ERJ3GEYJ682	M.RESISTOR CH 1/16W 6.8K	
R4904	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4905	ERJ3GEYJ471	M.RESISTOR CH 1/16W 470	
R4906	ERJ6GEYJ103	M.RESISTOR CH 1/10W 10K	
R4907	ERJ6GEYJ154	M.RESISTOR CH 1/10W 150K	
R4908	ERJ6GEYJ563	M.RESISTOR CH 1/10W 56K	
R4909	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
R4910	ERJ3GEYJ562	M.RESISTOR CH 1/16W 5.6K	
R4911	ERJ3GEYJ151	M.RESISTOR CH 1/16W 150	
R4912	ERJ3GEYJ471	M.RESISTOR CH 1/16W 470	
R4913	ERJ6GEYJ103	M.RESISTOR CH 1/10W 10K	
R4914	ERJ6GEYJ154	M.RESISTOR CH 1/10W 150K	
R4915	ERJ6GEYJ563	M.RESISTOR CH 1/10W 56K	
R4916	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
R4917	ERJ3GEYJ562	M.RESISTOR CH 1/16W 5.6K	
R4918	ERJ3GEYJ151	M.RESISTOR CH 1/16W 150	
R4919	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R4920	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4921	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4922	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4923	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4924	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4925	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R4927	ERJ3GEYJ103	M.RESISTOR CH 1/16W 10K	
R4999	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R6402	ERJ6GEYJ470	M.RESISTOR CH 1/10W 47	
R6803	ERJ6GEYJ181	M.RESISTOR CH 1/10W 180	



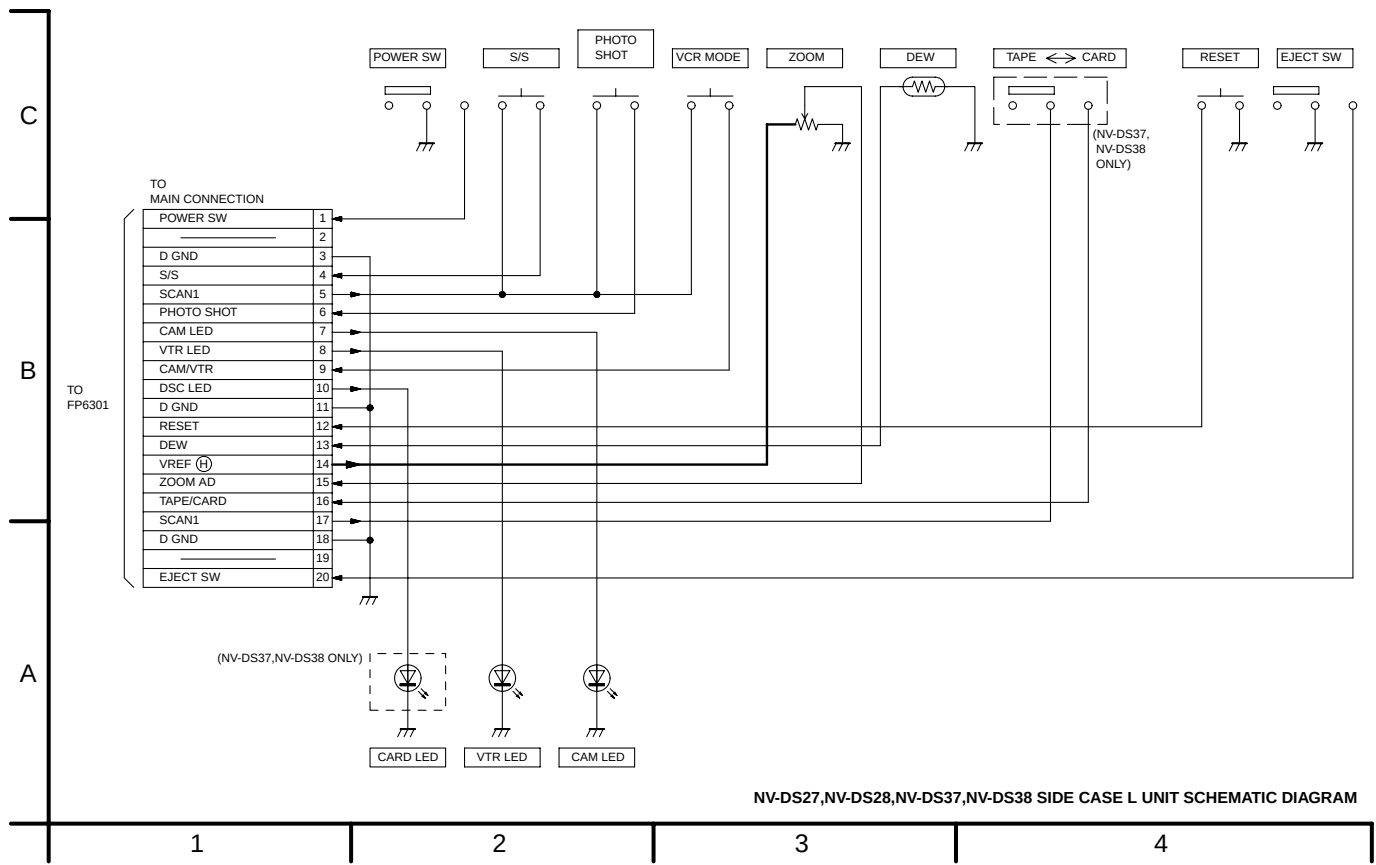
Ref. No.	Part No.	Part Name & Description	Remarks
VZ4501	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4502	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4503	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
VZ4902	VRT0158	TRANSIENT/SURGE ABSORBER	D4ED12710002
		MISCELLANEOUS	
.	VSC5209	MIC SHIELD PLATE	
.	VSC5231	JACK SHIELD PLATE	
.	VGQ6135	IR HOLDER	
.	VWJ1468	FRONT FPC	
■	VEP28284A	EVF C.B.A.	(RTL)
C802	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
D801	B3AFB0000016	LED (WHITE)	
D802	B3AFB0000016	LED (WHITE)	
D803	02DZ6.2YTPH3	DIODE	B0BC6R100014
D804	MA133	DIODE	
FP802	VJS3931B021	CONNECTOR (FEMALE) 21P	
FP803	K1MN22B00062	CONNECTOR	
Q801	XP4501	TRANSISTOR-TRANSISTOR	
R801	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R803	ERJ3RED470	M.RESISTOR CH 1/16W 47	
R804	ERJ3RED470	M.RESISTOR CH 1/16W 47	
R805	ERJ3GEYJ103	M.RESISTOR CH 1/16W 10K	
■	VEP26254A	MONITOR C.B.A.	(RTL)
C903	F3F0J1060005	TANTALUM CAPACITOR	
C906	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C907	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C908	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C909	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C910	ECUX1A104KBQ	C.CAPACITOR CH 10V 0.1U	
C911	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C913	ECUX1E471KBQ	C.CAPACITOR CH 25V 470P	
C916	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C917	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C918	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C921	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C923	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C927	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C929	ECUX1E152KBQ	C.CAPACITOR CH 25V 1500P	
C931	ECUM1A105KBN	C.CAPACITOR CH 10V 1U	
C932	ECUM1E105KBM	C.CAPACITOR CH 25V 1U	
C934	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C935	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C937	ECUX1A104KBQ	C.CAPACITOR CH 10V 0.1U	
C938	ECUX1H101JCQ	C.CAPACITOR CH 50V 100P	
C939	ECUX1H331GCV	C.CAPACITOR CH 50V 330P	

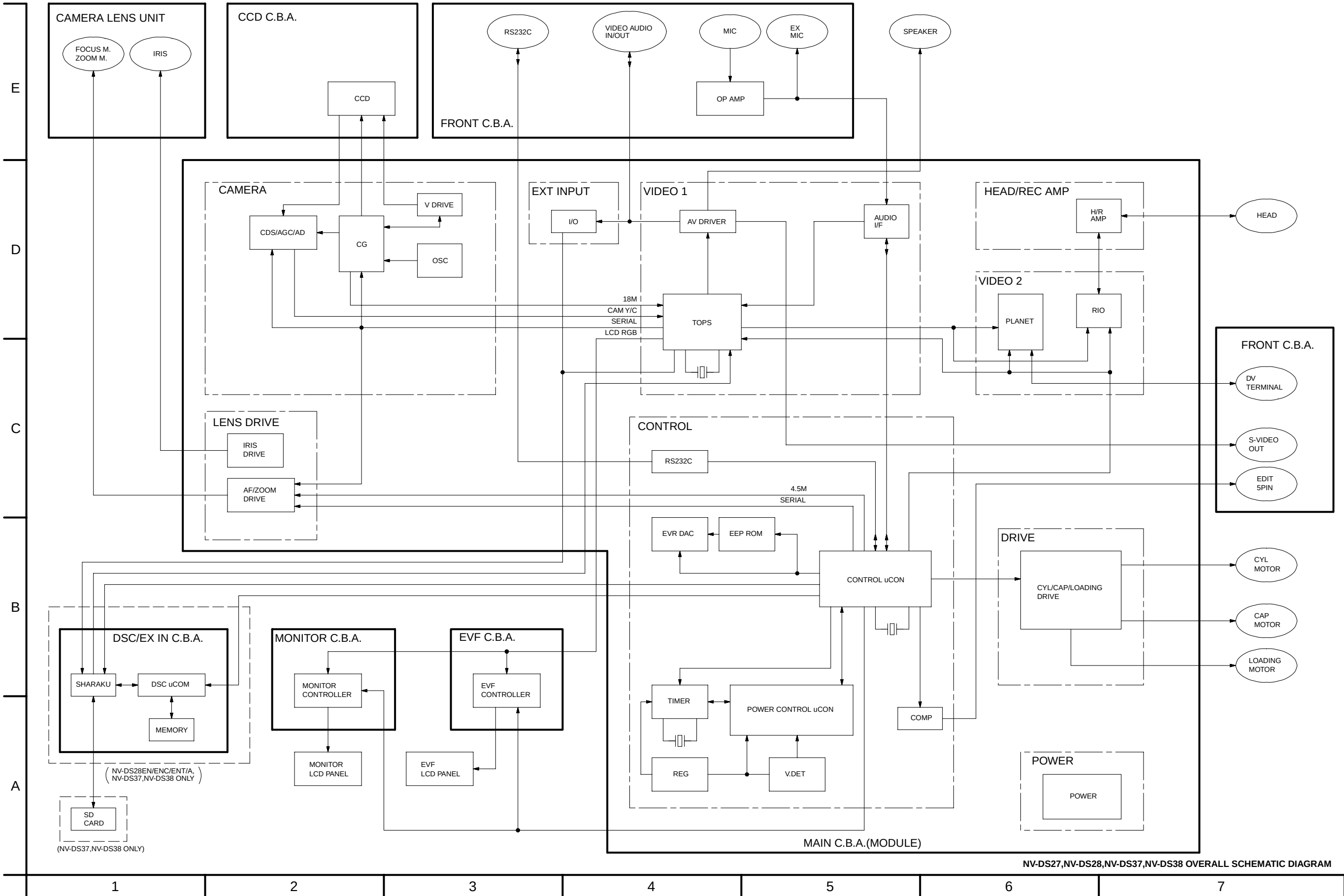
Ref. No.	Part No.	Part Name & Description	Remarks
C940	ECUX1H560JCQ	C.CAPACITOR CH 50V 56P	
C941	ECUX1H100CCQ	C.CAPACITOR CH 50V 10P	
C942	ECUM1C474KBN	C.CAPACITOR CH 16V 0.47U	
C943	ECUX1A224KBV	C.CAPACITOR CH 10V 0.22U	
C944	ECUX1A224KBV	C.CAPACITOR CH 10V 0.22U	
C945	ECUX1E332KBQ	C.CAPACITOR CH 25V 3300P	
C946	ECUM1C106VB	C.CAPACITOR CH 16V 10U	
C947	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C948	ECUX1C104KBV	C.CAPACITOR CH 16V 0.1U	
C950	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C952	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
C953	ECUX1C103KBQ	C.CAPACITOR CH 16V 0.01U	
D903	DAP222	DIODE	
D904	MA159A	DIODE	
D905	MA6S121	DIODE	
D906	MA111	DIODE	
D908	02DZ6.2YTPH3	DIODE	B0BC6R100014
FP901	VJS3320B024	CONNECTOR (FEMALE) 24P	K1MN24B00036
FP903	K1MN25B00033	CONNECTOR	
IC901	AN2540FHQ-V	IC	
IC902	TC4W53FU	IC	
IC908	SN74LV04APW	IC	C0JBAB000247
IC991	DN8797MS	HALL IC	
L901	VLQ0807K100	COIL 10UH	G1C100K00024
L905	VLQ0807K100	COIL 10UH	G1C100K00024
Q901	HN1C01FUYP	TRANSISTOR	B1HBCFA00001
Q902	2SK2159	TRANSISTOR	
Q903	HN1B04FUGRR	TRANSISTOR	B1HFCFE00001
Q905	HN1B04FUGRR	TRANSISTOR	B1HFCFE00001
Q906	2SA1832FY	TRANSISTOR	
QR901	DTC144TH	DIGITAL TRANSISTOR	
QR902	DTC114YH	DIGITAL TRANSISTOR	
QR903	DTC114YH	DIGITAL TRANSISTOR	
QR904	DTC144TH	DIGITAL TRANSISTOR	
QR905	UN9212	TRANSISTOR-RESISTOR	
R901	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R903	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R904	ERJ3RBD622	M.RESISTOR CH 1/16W 6.2K	
R907	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R908	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R909	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R910	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R912	ERJ3GEYJ334	M.RESISTOR CH 1/16W 330K	
R914	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R915	ERJ3RBD333	M.RESISTOR CH 1/16W 33K	
R917	ERJ3RBD103	M.RESISTOR CH 1/16W 10K	
R918	ERJ3GEYJ272	M.RESISTOR CH 1/16W 2.7K	
R919	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R920	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R921	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	



Ref. No.	Part No.	Part Name & Description	Remarks
R922	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R923	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R924	ERJ3GEYJ223	M.RESISTOR CH 1/16W 22K	
R925	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R926	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R927	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R928	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R929	ERJ3GEYJ220	M.RESISTOR CH 1/16W 22	
R930	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R931	ERJ3GEYJ393	M.RESISTOR CH 1/16W 39K	
R932	ERJ3RBD203	M.RESISTOR CH 1/16W 20K	
R933	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R934	ERJ3GEYJ103	M.RESISTOR CH 1/16W 10K	
R936	ERJ3GEYJ473	M.RESISTOR CH 1/16W 47K	
R937	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R938	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R939	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R940	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R941	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R942	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R943	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R945	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R946	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
R947	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R948	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R949	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R950	ERJ6GEY0R00	M.RESISTOR CH 1/10W 0	
R951	ERJ3GEYJ560	M.RESISTOR CH 1/16W 56	
R952	ERJ3GEYJ472	M.RESISTOR CH 1/16W 4.7K	
R953	ERJ3GEYJ823	M.RESISTOR CH 1/16W 82K	
R954	ERJ3GEY0R00	M.RESISTOR CH 1/16W 0	
R956	ERJ3RBD103	M.RESISTOR CH 1/16W 10K	
R957	ERJ3RBD101	M.RESISTOR CH 1/16W 100	
R958	ERJ3GEYJ153	M.RESISTOR CH 1/16W 15K	
R959	ERJ3GEYJ473	M.RESISTOR CH 1/16W 47K	
R960	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R961	ERJ3GEYJ272	M.RESISTOR CH 1/16W 2.7K	
R962	ERJ3GEYJ561	M.RESISTOR CH 1/16W 560	
R963	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R964	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R965	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R966	ERJ3GEYJ152	M.RESISTOR CH 1/16W 1.5K	
R967	ERJ3GEYJ104	M.RESISTOR CH 1/16W 100K	
R968	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R969	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	
R970	ERJ3GEYJ562	M.RESISTOR CH 1/16W 5.6K	
R971	ERJ3GEYJ335	M.RESISTOR CH 1/16W 3.3M	
R972	ERJ3GEYJ224	M.RESISTOR CH 1/16W 220K	
R973	ERJ8GEYJ335	M.RESISTOR CH 1/8W 3.3M	
R974	ERJ8GEYJ335	M.RESISTOR CH 1/8W 3.3M	
R975	ERJ3GEYJ223	M.RESISTOR CH 1/16W 22K	
R976	ERJ3RBD681	M.RESISTOR CH 1/16W 680	
R977	ERJ3RED180	M.RESISTOR CH 1/16W 18	
R978	ERJ6GEYJ335	M.RESISTOR CH 1/10W 3.3M	
R979	ERJ3GEYJ224	M.RESISTOR CH 1/16W 220K	
R980	ERJ3GEYJ101	M.RESISTOR CH 1/16W 100	
R983	ERJ3GEYJ333	M.RESISTOR CH 1/16W 33K	

Ref. No.	Part No.	Part Name & Description	Remarks
R988	ERJ3GEYJ102	M.RESISTOR CH 1/16W 1K	
T901	ETJ09K59AZ	CHIP TRANSFORMER	
T902	EFTU21R203	TRANSFORMER	
■	VEP22308A	CCD FLEX.CARD C.B.A.	(RTL)
C291	ECUM1C105KBN	C.CAPACITOR CH 16V 1U	
C295	ECUM1E104KBN	C.CAPACITOR CH 25V 0.1U	
D291	MA143	DIODE	
PS291	K1KB14A00039	CONNECTOR(FEMALE) 14P	
Q291	2SC3930	CHIP TRANSISTOR	
R292	ERJ6GEYJ822	M.RESISTOR CH 1/10W 8.2K	
		MISCELLANEOUS	
.	VJB22308	CCD FLEX. CARD	
■	VEK9290	LENS FLEX.CARD C.B.A.	(RTL)
		MISCELLANEOUS	
.	HT-120B	HALL SENSOR	
.	VSP1083	DETECTION SWITCH	K0L1BA000015
.	VJB20865	LENS FLEX. CARD	



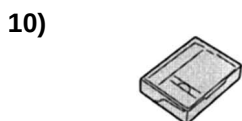
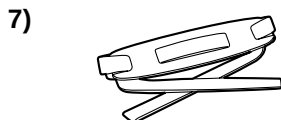
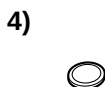
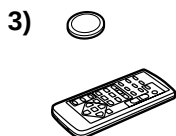
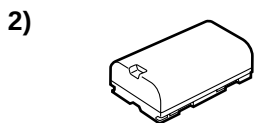
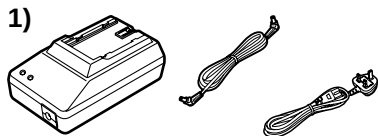


NV-DS27,NV-DS28,NV-DS37,NV-DS38 OVERALL SCHEMATIC DIAGRAM

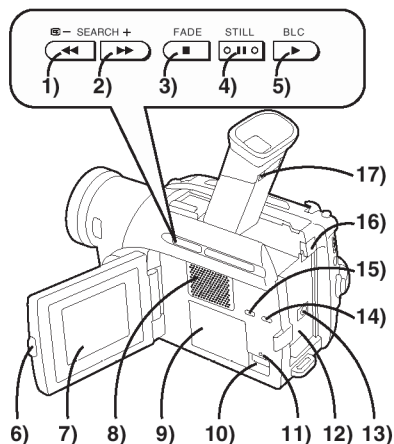
Standard Accessories

Illustrated on the left are accessories supplied with the Movie Camera.

- 1) AC Adaptor, DC Input Lead and AC Mains Lead
- 2) Battery Pack
- 3) Remote Controller and Button-Type Battery
- 4) Button-Type Battery for Built-In Clock
- 5) Lens Cap
- 6) AV Cable
- 7) Shoulder Strap
- 8) SD Memory Card (NV-DS37, NV-DS38 only)
- 9) Personal Computer Connection Kit (NV-DS28EN/ENC/ENT/A, NV-DS37, NV-DS38 only)
- 10) Digital Video Head Cleaner (NV-DS28EN/ENC/ENT/A, NV-DS38EN/ENT/A only)



Controls and Components



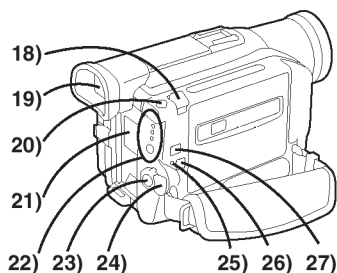
- 1) Reverse Search Button [-SEARCH]
Rewind/Review Button [◀◀]
Recording Check Button [G]
- 2) Forward Search Button [SEARCH+]
Fast Forward/Cue Button [▶▶]
- 3) Fade Button [FADE]
Stop Button [■]
- 4) Still Button [STILL]
Pause Button [||]
- 5) Backlight Button [BLC]
Play Button [▶]
- 6) LCD Monitor Open Button [PUSH OPEN]
- 7) LCD Monitor

• Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD Monitor screen. However, this is not a malfunction and does not affect the recorded picture.

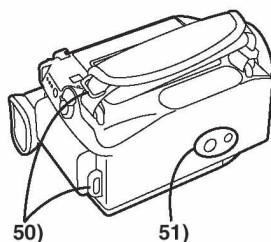
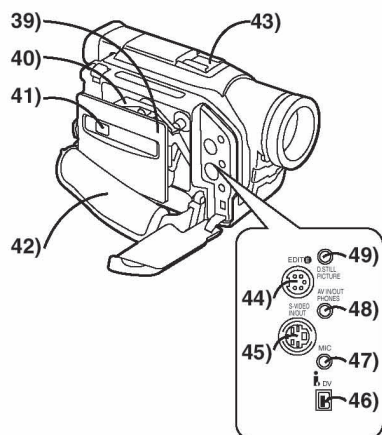
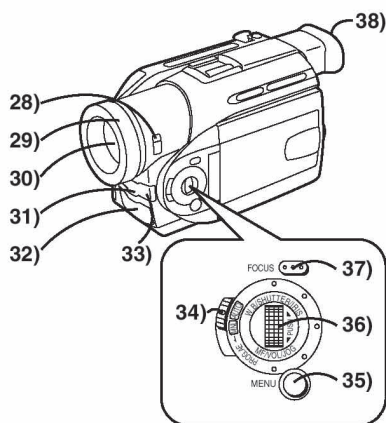
- 8) Speaker
- 9) Card Compartment Cover (NV-DS37/DS38 only)
- 10) Card Compartment Open Lever [OPEN] (NV-DS37/DS38 only)
- 11) Card Access Lamp [ACCESS] (NV-DS37/DS38 only)
- 12) Battery Holder
- 13) DC Input Socket [DC IN]
- 14) Card Multi-Picture Button [CARD MULTI] (NV-DS37/DS38 only)

- 15) Title Button [TITLE] (NV-DS37/DS38 only)
- 16) Battery Eject Button [PUSH]
- 17) Eyepiece Corrector Knob
- 18) Zoom Lever [W/T]
- 19) Viewfinder

• Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the Viewfinder screen. However, this is not a malfunction and does not affect the recorded picture.



- 20) Photoshot Button [PHOTO SHOT]
- 21) Cover of the Button-type Battery's Compartment [BACKUP BATTERY]
- 22) Mode Button [MODE]/Mode Lamps
- 23) Recording Start/Stop Button
- 24) Movie Camera Off/On Switch [OFF/ON]
- 25) Reset Button [RESET]
- 26) Cassette Eject Lever [▲EJECT]
- 27) Tape/Card Photoshot Selector [TAPE/CARD] (NV-DS37/DS38 only)



28) 0-Lux Recording Switch [0 LUX OFF/ON]

29) Lens Hood

30) Lens

31) Recording Lamp

32) Microphone (built-in, stereo)

33) White Balance Sensor
Remote Control Sensor
Built-in Infra-red Beam Emitters

34) Mode Selector Switch [AUTO/MNL/PROG.AE]

35) Menu Button [MENU]

36) Multi-Function Dial [PUSH]

37) Focus Button [FOCUS]

38) Eyecup

39) Cassette Compartment Cover

40) Cassette Holder

41) Cassette Compartment Lock Button [PUSH LOCK]

42) Grip Belt

43) Accessory Shoe

- Accessories, such as a stereo microphone (VW-VMS2E; optional), are attached here.

44) Edit Socket [EDIT]

45) S-Video Input/Output Socket [S-VIDEO IN/OUT] (Input function on NV-DS38 model only)

46) DV Terminal (i.LINK) [i.] (Input function on NV-DS28/DS38 Model only)

- Connect this to the digital video equipment.
- “i.LINK” is the name of connectors in accordance with IEEE1394-1995. “i.” is a logo marked on products conforming with the “i.LINK” specifications.

47) Microphone Socket [MIC]

- Connect with an external microphone or audio equipment. (When this socket is in use, the built-in microphone does not operate.)

48) Audio-Video Input/Output Socket [AV IN/OUT] (Input function on NV-DS38 model only)

Headphone Socket [PHONES]

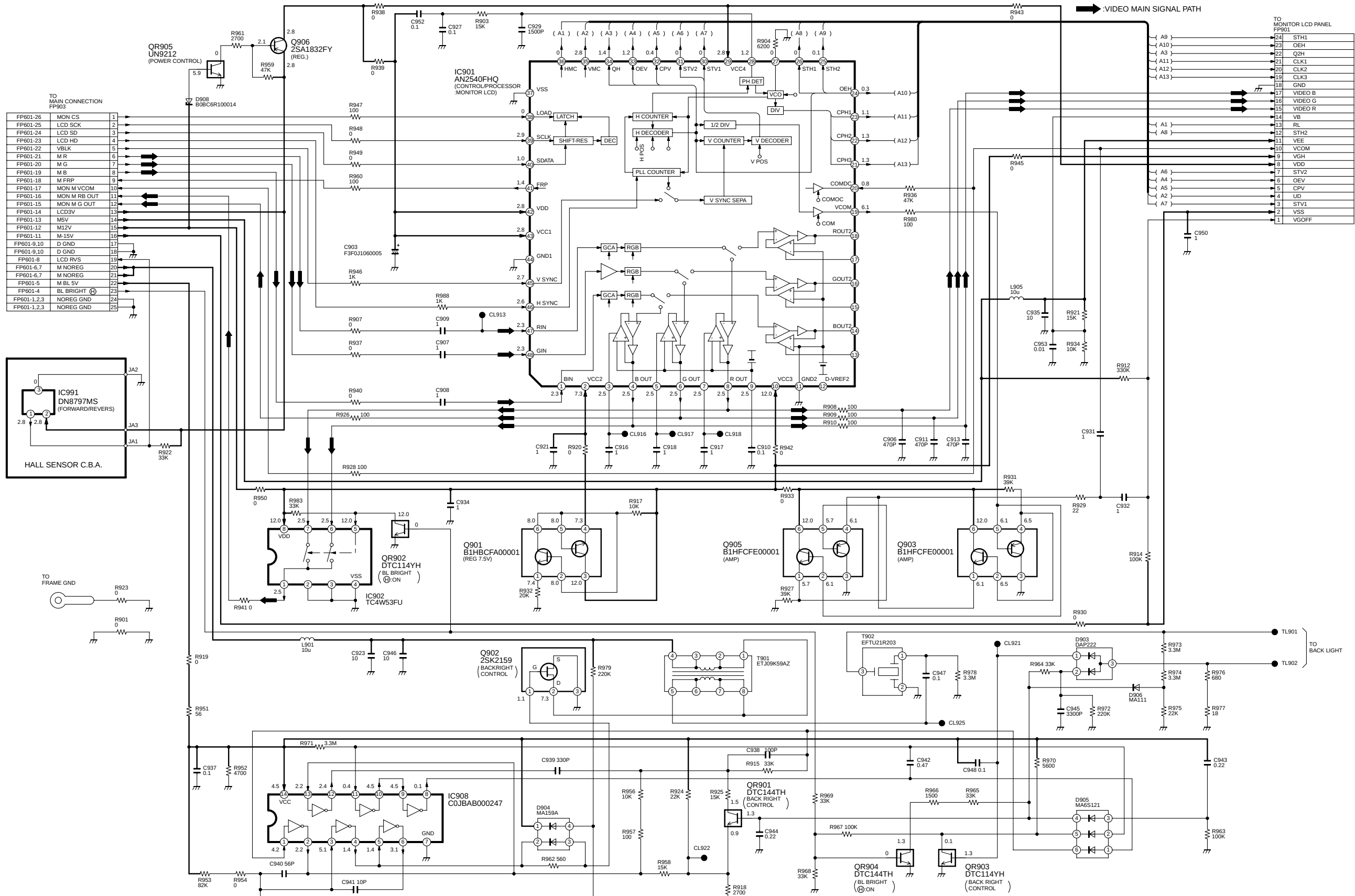
- Connecting an AV Cable to this socket activates the Movie Camera’s built-in speaker, but connecting a headphone, etc. deactivates it.

49) Digital Still Picture Terminal [D.STILL PICTURE]

50) Shoulder Strap Holders

51) Tripod Receptacle

- Used for mounting the Movie Camera on an optional tripod.

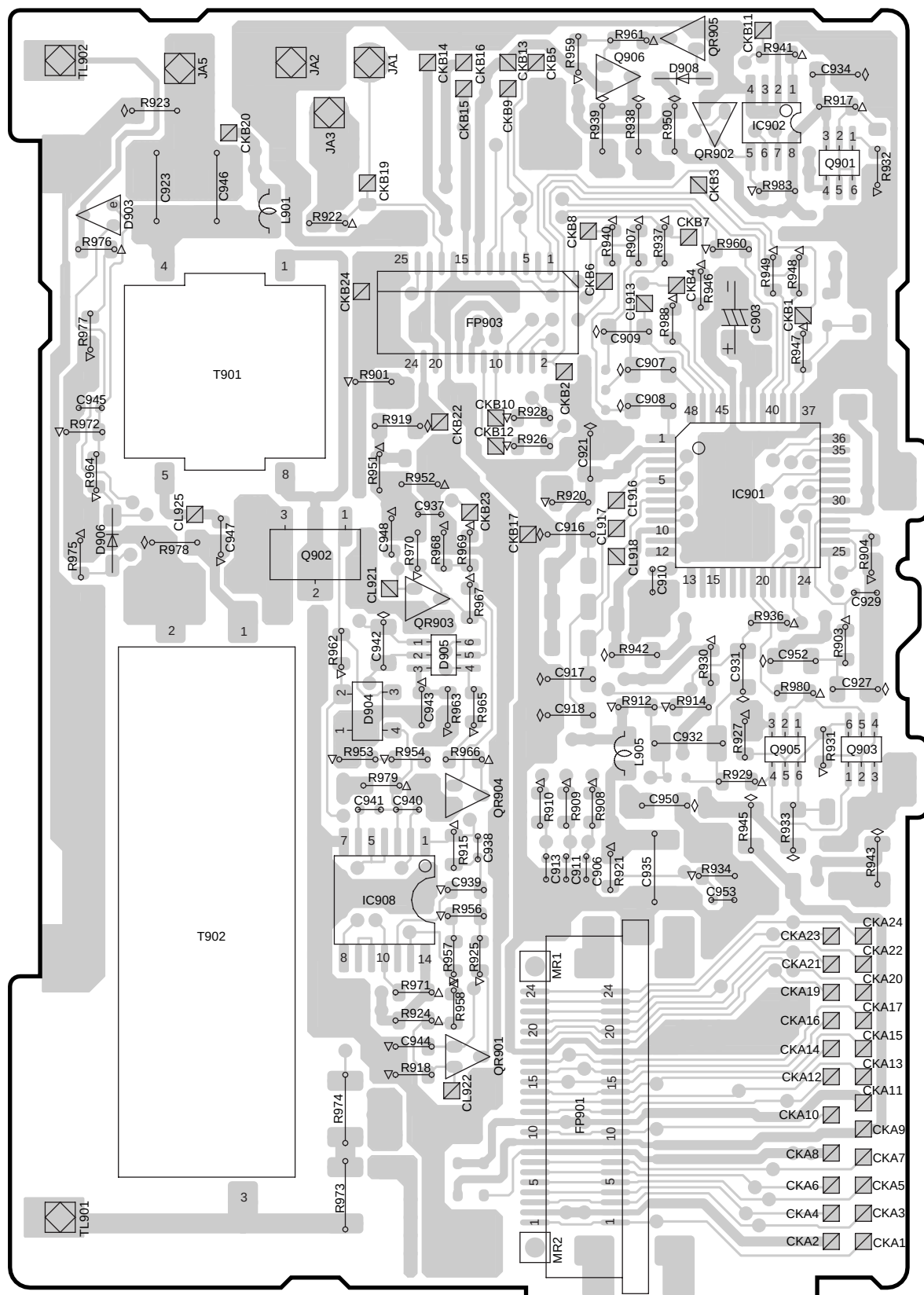


NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC
DIAGRAM FOR ORDERING WHEN YOU ORDER A PART, PLEASE
REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS
DIAGRAM IS STOP MODE (MONITOR:ON)

NV-DS27,NV-DS28,NV-DS37,NV-DS38
MONITOR & HALL SENSOR SCHEMATIC DIAGRAM

F
E
D
C
B
A



NOTE: MULTILAYER C.B.A.

THIS C.B.A. IS Multi-Layer C.B.A. THIS CIRCUIT BOARD SHOWS COMPONENT LAYOUT-PATTERN FOR COMPONENT SIDE AND FOIL SIDE. LAYOUT-PATTERNS ARE SINGLE PATTERN FOR EACH SIDE THAT MAKE EASY TO SIGHT THE COMPONENT LAYOUT.

NV-DS27,NV-DS28,NV-DS37,NV-DS38
MONITOR C.B.A.
VEP26254A

1

2

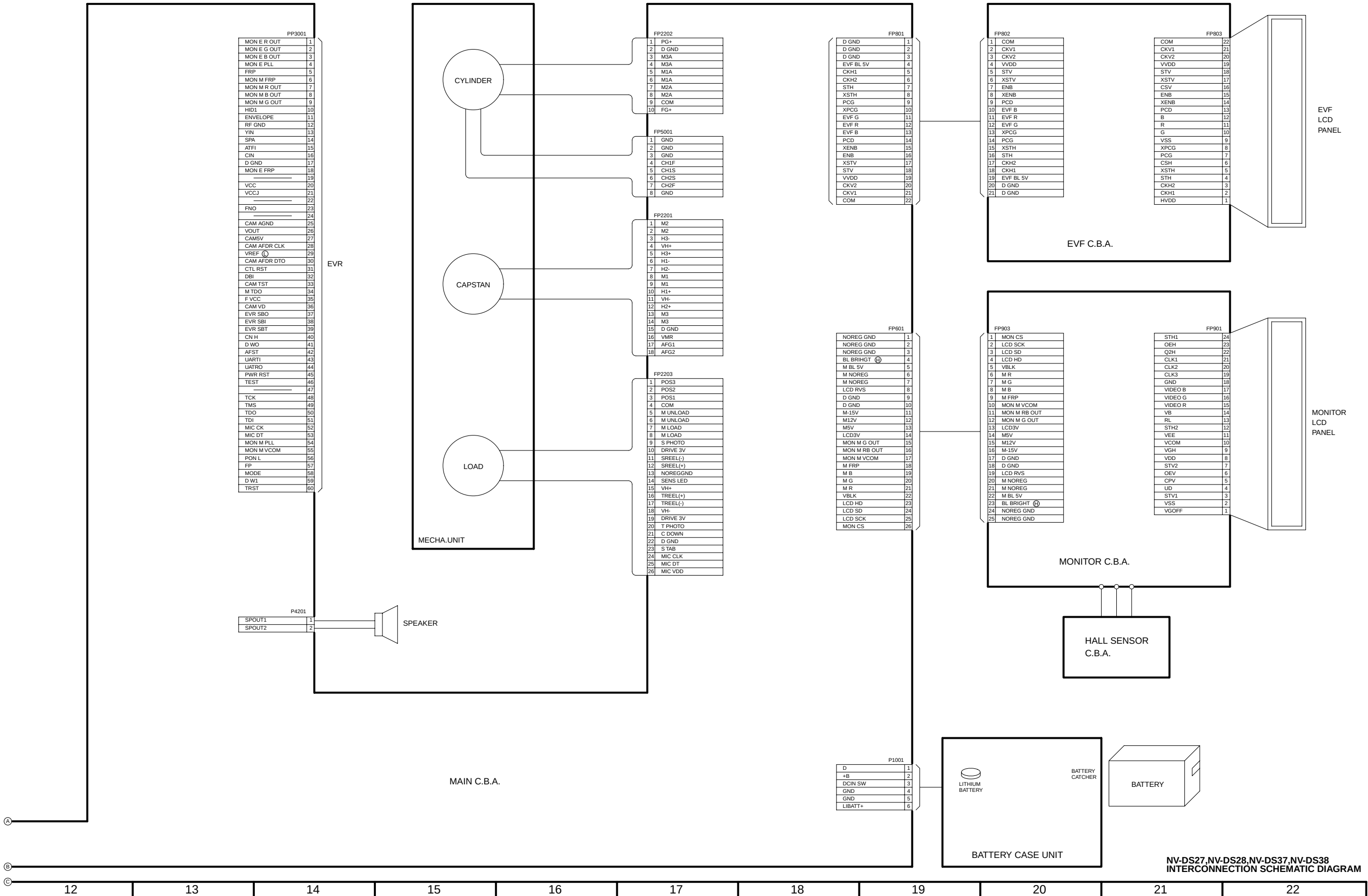
3

4

Monitor C.B.A.

Integrated Circuit		D905	C-3	C940	C-2	R926	D-3	R961	F-3
IC901	D-4	D906	D-1	C941	C-2	R927	C-4	R962	D-2
IC902	F-4	D908	F-4	C942	D-2	R928	D-3	R963	C-3
IC908	B-2	Coil		C943	C-3	R929	C-4	R964	D-1
Transistor		L901	E-2	C944	B-3	R930	C-4	R965	C-3
Q901	D-4	L905	C-3	C945	E-1	R931	C-4	R966	C-3
Q902	D-2	Transformer		C946	E-2	R932	F-4	R967	D-3
Q903	C-4	T901	E-2	C947	D-2	R933	C-4	R968	D-3
Q905	C-4	T902	B-2	C948	D-2	R934	C-4	R969	D-3
Q906	F-3	Capacitor		C950	C-4	R936	D-4	R970	D-3
Transistor & Resistor		C903	E-4	C952	C-4	R937	E-4	R971	B-3
QR901	B-3	C906	C-3	C953	B-4	R938	F-3	R972	D-1
QR902	F-4	C907	E-4	Resistor		R939	F-3	R973	A-2
QR903	D-3	C908	E-4	R901	E-2	R940	E-4	R974	B-2
QR904	C-3	C909	E-3	R903	D-4	R941	F-4	R975	D-1
QR905	F-4	C910	D-4	R904	D-4	R942	C-3	R976	E-1
Connector		C911	C-3	R907	E-4	R943	C-4	R977	E-1
FP901	B-3	C913	C-3	R908	C-3	R945	C-4	R978	D-2
FP903	E-3	C916	D-3	R909	C-3	R946	E-4	R979	C-2
Test Point		C917	C-3	R910	C-3	R947	E-4	R980	C-4
CL913	E-4	C918	C-3	R912	C-3	R948	E-4	R983	E-4
CL916	D-3	C921	D-3	R914	C-4	R949	E-4	R988	E-4
CL917	D-3	C923	E-1	R915	C-3	R950	F-4	Jumper	
CL918	D-3	C927	C-4	R917	F-4	R951	D-2	JA1	F-2
CL921	D-2	C929	D-4	R918	B-3	R952	D-3	JA2	F-2
CL922	B-3	C931	C-4	R919	D-2	R953	C-2	JA3	F-2
CL925	D-2	C932	C-4	R920	D-3	R954	C-2	JA5	F-2
TL901	A-1	C934	F-4	R921	C-3	R956	B-3		
TL902	F-1	C935	C-4	R922	E-2	R957	B-3		
Diode		C937	D-3	R923	F-1	R958	B-3		
D903	E-1	C938	C-3	R924	B-3	R959	F-3		
D904	C-2	C939	C-3	R925	B-3	R960	E-4		

ADDRESS INFORMATION



G

F

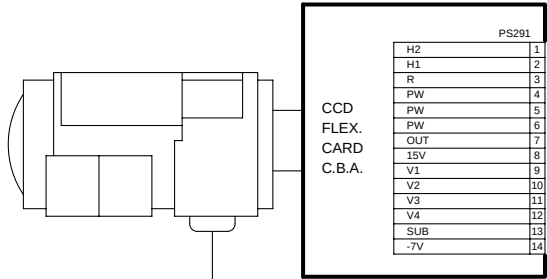
E

D

C

B

A



PP201

1	H2
2	H1
3	R
4	PW
5	PW
6	PW
7	OUT
8	15V
9	V1
10	V2
11	V3
12	V4
13	SUB
14	-7V

FP701

1	FMT4
2	FMT1
3	FMT2
4	FMT3
5	F.ENC
6	FENCVCC
7	ZMT4
8	ZMT1
9	ZMT2
10	ZMT3
11	ZENC
12	LED CONT
13	ALC MAIN(+)
14	HOLE IN(+)
15	HOLE OUT(+)
16	DLUXSW(+)
17	HOLE IN(-)
18	HOLE OUT(-)
19	ALC MAIN(-)
20	GND DLUXSW(-)
21	ALCNT(-)
22	ALCNT(+)

FP6302

1	CAM NNL
2	CAM MOD
3	ENC SW
4	D GND
5	ENC+
6	ENC-
7	D GND
8	LCD OPEN
9	MENU
10	SCAN3
11	PLAY/BLC
12	PAUSE/STILL
13	STOP/FADE
14	ENC(+)
15	D GND
16	ENC SW
17	CAM MOD
18	CAM MNL

FP6301

1	EJECT SW
2	
3	D GND
4	S/S
5	SCAN1
6	TAPE/CARD
7	PHOTO SHOT
8	VREF
9	RESET
10	D GND
11	DSC LED
12	RESET
13	CAM/VTR
14	VREF
15	CAM LED
16	PHOTO SHOT
17	SCAN1
18	S/S
19	D GND
20	POWER SW

FP4801

1	REMOTE CTL
2	CR POWER
3	IROUT
4	SERIAL DATA
5	NOREG
6	SERIAL CLK
7	IRLEDOUT
8	ESV
9	5V
10	TALLY
11	UARTI
12	UARTO
13	D GND
14	PLUGIN
15	R/GND
16	L/HPL
17	V/HPR
18	AV GND
19	AV GND
20	AV GND
21	AV GND
22	AV GND
23	SY
24	SPLUG
25	SC
26	EXTMIC
27	MICSV
28	MICSV
29	MIC(R)
30	MIC(L)
31	MICGND
32	MICGND
33	MICGND
34	MICGND
35	TPB-
36	TPB+
37	TPA-
38	TPA+
39	TPA+

FP4903

39	REMOTE CTL
38	REMOTE CTL
37	CR POWER
36	IR OUT
35	SERIAL DATA
34	NOREG
33	SERIAL CLK
32	IR LED OUT
31	ESV
30	5V
29	TALLY
28	UARTI
27	UARTO
26	D GND
25	PLUGIN
24	R/GND
23	L/HPL
22	V/HPR
21	AV-GND
20	AV-GND
19	AV-GND
18	AV-GND
17	AV-GND
16	SY
15	S PLUG
14	SC
13	EXT MIC
12	MIC 5V
11	MIC 5V
10	MIC(R)
9	MIC(L)
8	MIC GND
7	MIC GND
6	MIC GND
5	MIC GND
4	TPB-
3	TPB+
2	TPA-
1	TPA+

MIC

JK2501

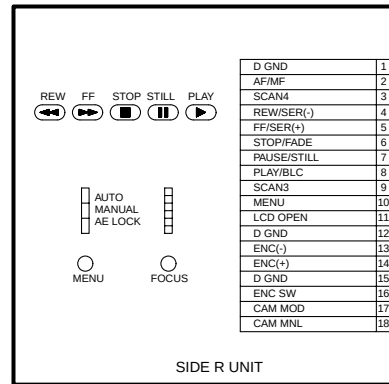
AV IN/OUT PHONE

JK4502

DV TERMINAL

FRONT C.B.A.

(NV-DS28EN/ENC/ENT/A,NV-DS37,NV-DS38 ONLY)



D GND	1
AF/MF	2
SCAN4	3
REW/SER(-)	4
FF/SER(+)	5
STOP/FADE	6
PAUSE/STILL	7
PLAY/BLC	8
SCAN3	9
MENU	10
LCD OPEN	11
D GND	12
ENC(-)	13
ENC(+)	14
D GND	15
ENC SW	16
CAM MOD	17
CAM MNL	18

PS3901

SEPY	1	100	CVBS
SYIO	2	99	VHPR
AVIN	3	98	SCIO
TDI-TOPS	4	97	SEPC
D GND	5	96	D GND
D GND	6	95	D GND
D GND	7	94	D GND
D GND	8	93	D GND
INPUT SEL	9	92	
REG ASV	10	91	REG ASV
XCPU RST	11	90	SIF XRST
SIF 1.8V	12	89	SIF 1.8V
REG 2.5V	13	88	REG 2.5V
YDATA10	14	87	YDATA11
YDATA12	15	86	YDATA13
YDATA14	16	85	YDATA15
YDATA16	17	84	YDATA17
CDATA10	18	83	CDATA11
CDATA12	19	82	CDATA13
CDATA14	20	81	CDATA15
CDATA16	21	80	CDATA17
INH1	22	79	INV1
CLK27B	23	78	CLK135
YDATA20	24	77	YDATA21
YDATA22	25	76	YDATA23
YDATA24	26	75	YDATA25
YDATA26	27	74	YDATA27
CDATA20	28	73	CDATA21
CDATA22	29	72	CDATA23
CDATA24	30	71	CDATA25
CDATA26	31	70	CDATA27
INH2	32	69	INV2
EXT PAUSE	33	68	SYNC DET
SIF CS	34	67	SIF SDA
DSC WAKEUP	35	66	SIF SCK
DSC XRST	36	65	DSC RST
DSC CLK	37	64	DSC FRP
DSC DTO	38	63	DSC DTI
DSC BUSY	39	62	TMS
D W0	40	61	TCK
DSC 5V	41	60	D W1
DSC 5V	42	59	DSC 5V
DSC 1.8V	43	58	DSC 1.8V
SCAN2	44	57	CARD DET
MULTI	45	56	CARD PRO
D GND	46	55	TDI DSC
D GND	47	54	DOOR OPEN
D GND	48	53	TITLE
D GND	49	52	D GND
D GND	50	51	D GND

PP3901

SEPY	1	100	CVBS
SYIO	2	99	VHPR
AVIN	3	98	SCIO
TDI-TOPS	4	97	SEPC
D GND	5	96	D GND
D GND	6	95	D GND
D GND	7	94	D GND
D GND	8	93	D GND
INPUT SEL	9	92	
REG ASV	10	91	REG ASV
XCPU RST	11	90	SIF XRST
SIF 1.8V	12	89	SIF 1.8V
REG 2.5V	13	88	REG 2.5V
YDATA10	14	87	YDATA11
YDATA12	15	86	YDATA13
YDATA14	16	85	YDATA15
YDATA16	17	84	YDATA17
CDATA10	18	83	CDATA11
CDATA12	19	82	CDATA13
CDATA14	20	81	CDATA15
CDATA16	21	80	CDATA17
INH1	22	79	INV1
CLK27B	23	78	CLK135
YDATA20	24	77	YDATA21
YDATA22	25	76	YDATA23
YDATA24	26	75	YDATA25
YDATA26	27	74	YDATA27
CDATA20	28	73	CDATA21
CDATA22	29	72	CDATA23
CDATA24	30	71	CDATA25
CDATA26	31	70	CDATA27
INH2	32	69	INV2
EXT PAUSE	33	68	SYNC DET
SIF CS	34	67	SIF SDA
DSC WAKEUP	35	66	SIF SCK
DSC XRST	36	65	DSC RST
DSC CLK	37	64	DSC FRP
DSC DTO	38	63	DSC DTI
DSC BUSY	39	62	TMS
D W0	40	61	TCK
DSC 5V	41	60	D W1
DSC 5V	42	59	DSC 5V
DSC 1.8V	43	58	DSC 1.8V
SCAN2	44	57	CARD DET
MULTI	45	56	CARD PRO
D GND	46	55	TDI DSC
D GND	47	54	DOOR OPEN
D GND	48	53	TITLE
D GND	49	52	D GND
D GND	50	51	D GND

FP3902

DOOR OPEN	1
DSC GND	2
CARD LED	3
MULTI	4
SCAN2	5
TITLE	6
CARD D2	7
CARD D3	8
CARD CMD	9
DSC GND	10
DSC GND	11
DSC 3.15V	12
DSC 3.15V	13
CARD CLK	14
CARD DET	15
CARD D0	16
CARD D1	17
CARD PRO	18

DOOR OPEN	1
DSC GND	2
CARD LED	3
MULTI	4
SCAN2	5
TITLE	6
CARD D2	7
CARD D3	8
CARD CMD	9
DSC GND	10
DSC GND	11
DSC 3.15V	12
DSC 3.15V	13
CARD CLK	14
CARD DET	15
CARD D0	16
CARD D1	17
CARD PRO	18

CARD D2	1
CARD D3	2
CARD CMD	3
DSC GND	4
DSC 3.15V	5
CARD CLK	6
CARD DET	7
CARD D0	8
CARD D1	9
CARD PRO	10
FRAME GND	11
FRAME GND	12
FRAME GND	13

OPEN TITLE CARD MULTI

DSC FLEX.

DSC/EX IN C.B.A.

1

2

3

4

5

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10

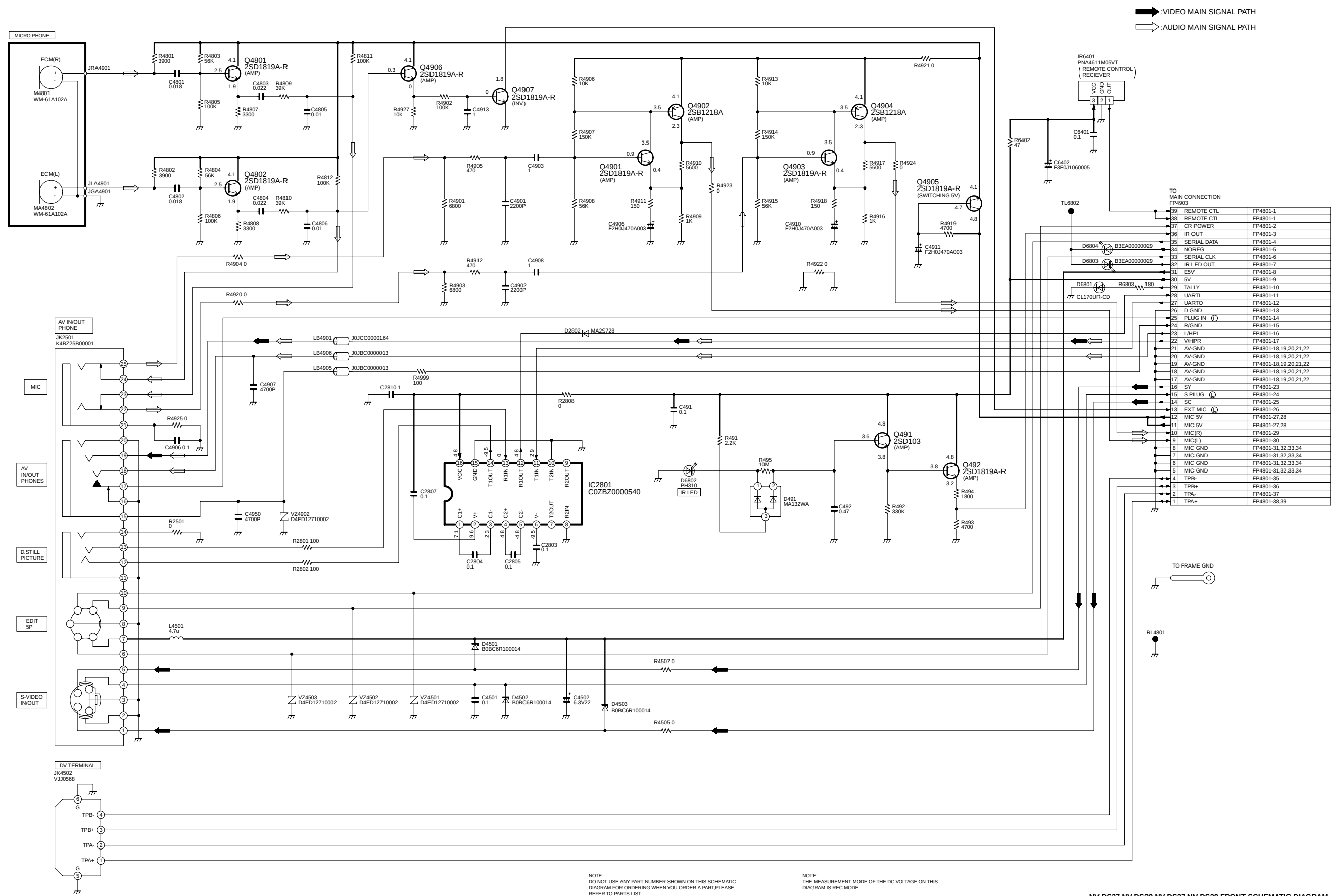
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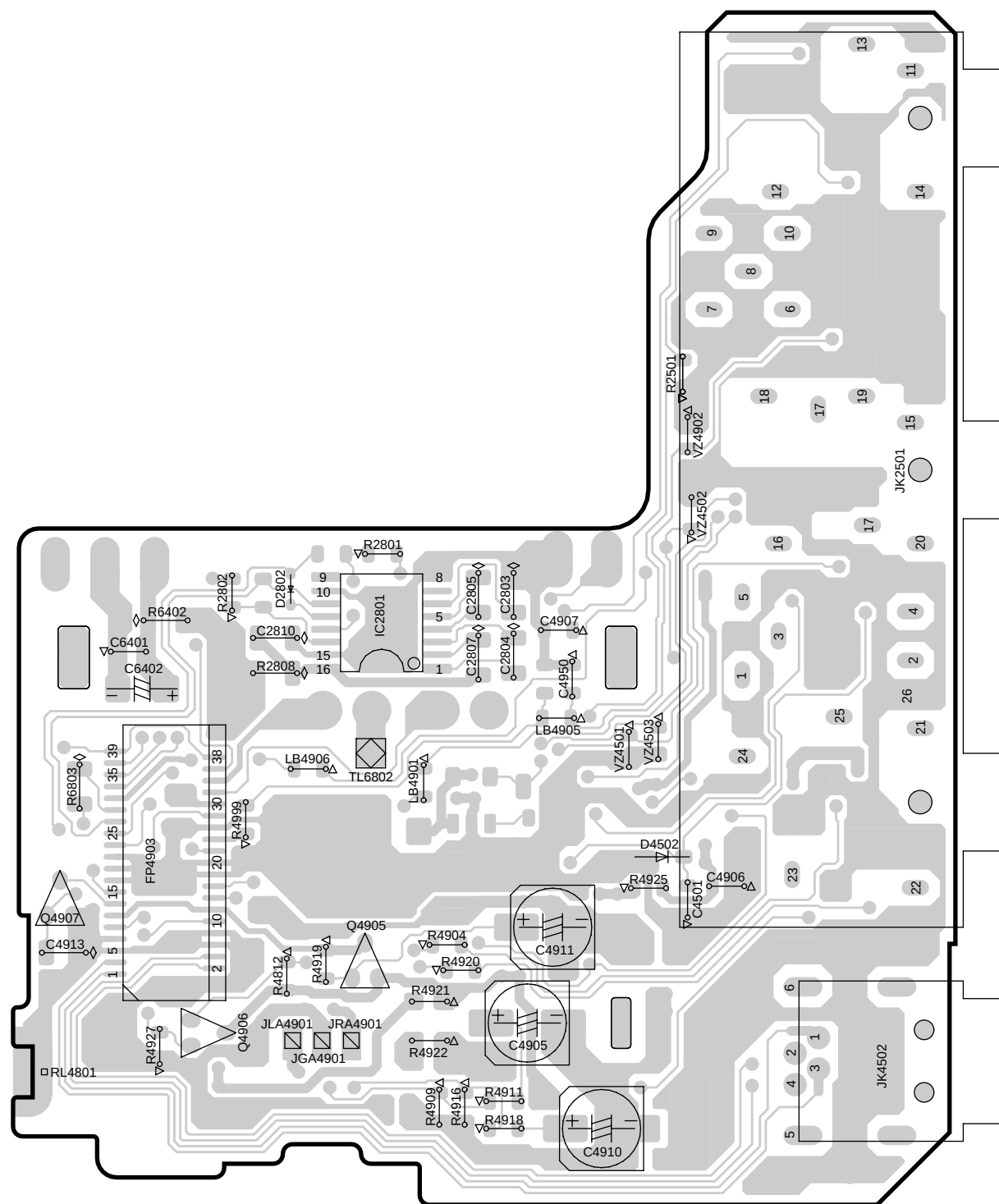
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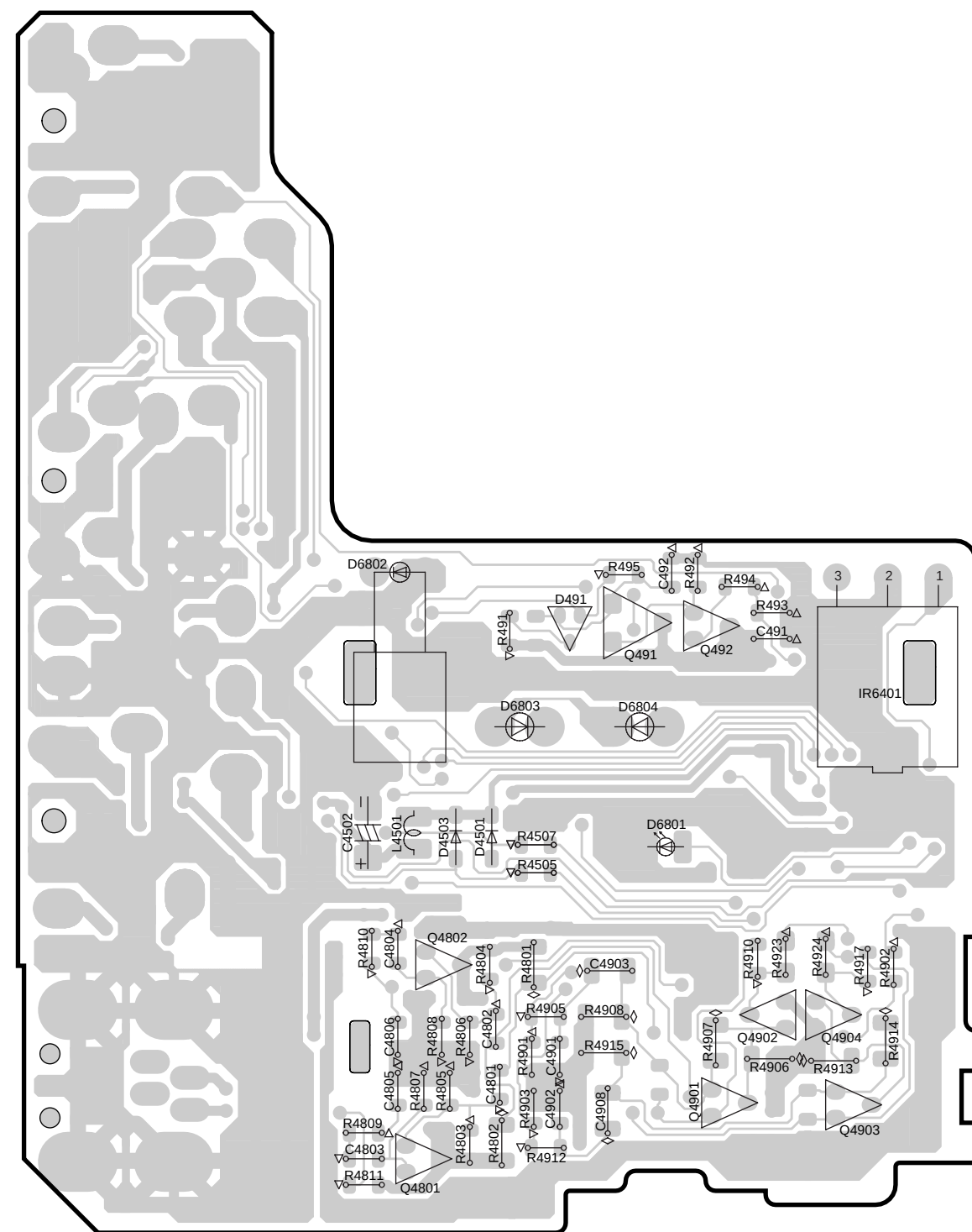
G
F
E
D
C
B
A



NV-DS27,NV-DS28,NV-DS37,NV-DS38 FRONT SCHEMATIC DIAGRAM



(COMPONENT SIDE)



(FOIL SIDE)

NV-DS27,NV-DS28,NV-DS37,NV-DS38
FRONT C.B.A.
VEP04773A

Front C.B.A.

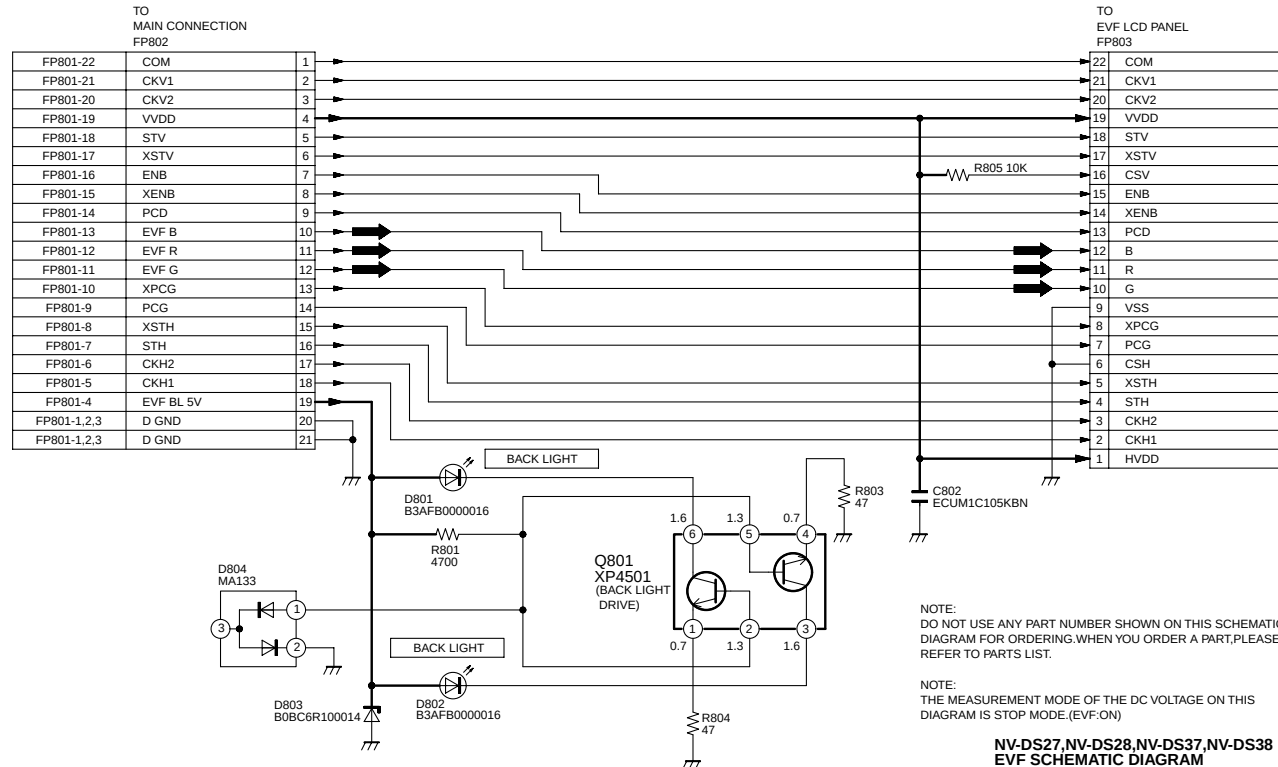
Integrated Circuit		D4503	B-7	C4805	A-7	R4803	A-7	R4920	B-3
IC2801	C-2	D6801	B-8	C4806	B-7	R4804	B-7	R4921	B-3
Transistor		D6802	C-7	C4901	B-7	R4805	A-7	R4922	B-3
Q491	C-8	D6803	C-7	C4902	A-7	R4806	B-7	R4923	B-8
Q492	C-8	D6804	C-8	C4903	B-8	R4807	A-7	R4924	B-8
Q4801	A-7	Coil		C4905	B-3	R4808	B-7	R4925	B-3
Q4802	B-7	L4501	B-7	C4906	B-4	R4809	A-7	R4927	A-1
Q4901	A-8	LB4901	C-3	C4907	C-3	R4810	B-7	R4999	B-2
Q4902	B-8	LB4905	C-3	C4908	A-8	R4811	A-7	R6402	C-1
Q4903	A-9	LB4906	C-2	C4910	A-3	R4812	B-2	R6803	C-1
Q4904	B-9	Absorber		C4911	B-3	R4901	B-7	Jumper	
Q4905	B-2	VZ4501	C-3	C4913	B-1	R4902	B-9	JGA4901	B-2
Q4906	B-2	VZ4502	D-4	C4950	C-8	R4903	A-7	JLA490	B-2
Q4907	B-1	VZ4503	C-3	C6401	C-1	R4904	B-3	JRA4901	B-2
Connector		VZ4902	D-4	C6402	C-1	R4905	B-7		
FP4903	B-1	Capacitor		Resistor		R4906	B-8		
Jack		C491	C-8	R491	C-7	R4907	B-8		
JK2501	D-4	C492	C-8	R492	C-8	R4908	B-8		
JK4502	A-4	C2803	C-3	R493	C-8	R4909	A-3		
Test Point		C2804	C-3	R494	C-8	R4910	B-8		
RL4801	A-1	C2805	C-3	R495	C-8	R4911	A-3		
TL6802	C-2	C2807	C-3	R2501	D-4	R4912	A-7		
IR Reseiver		C2810	C-2	R2801	C-2	R4913	B-9		
IR6401	C-9	C4501	B-4	R2802	C-2	R4914	B-9		
Diode		C4502	B-7	R2808	C-2	R4915	B-8		
D491	C-7	C4801	A-7	R4505	B-7	R4916	A-3		
D2802	C-2	C4802	B-7	R4507	B-7	R4917	B-9		
D4501	B-7	C4803	A-7	R4801	B-7	R4918	A-3		
D4502	B-3	C4804	B-7	R4802	A-7	R4919	B-2		

➡ :VIDEO MAIN SIGNAL PATH

C

B

A

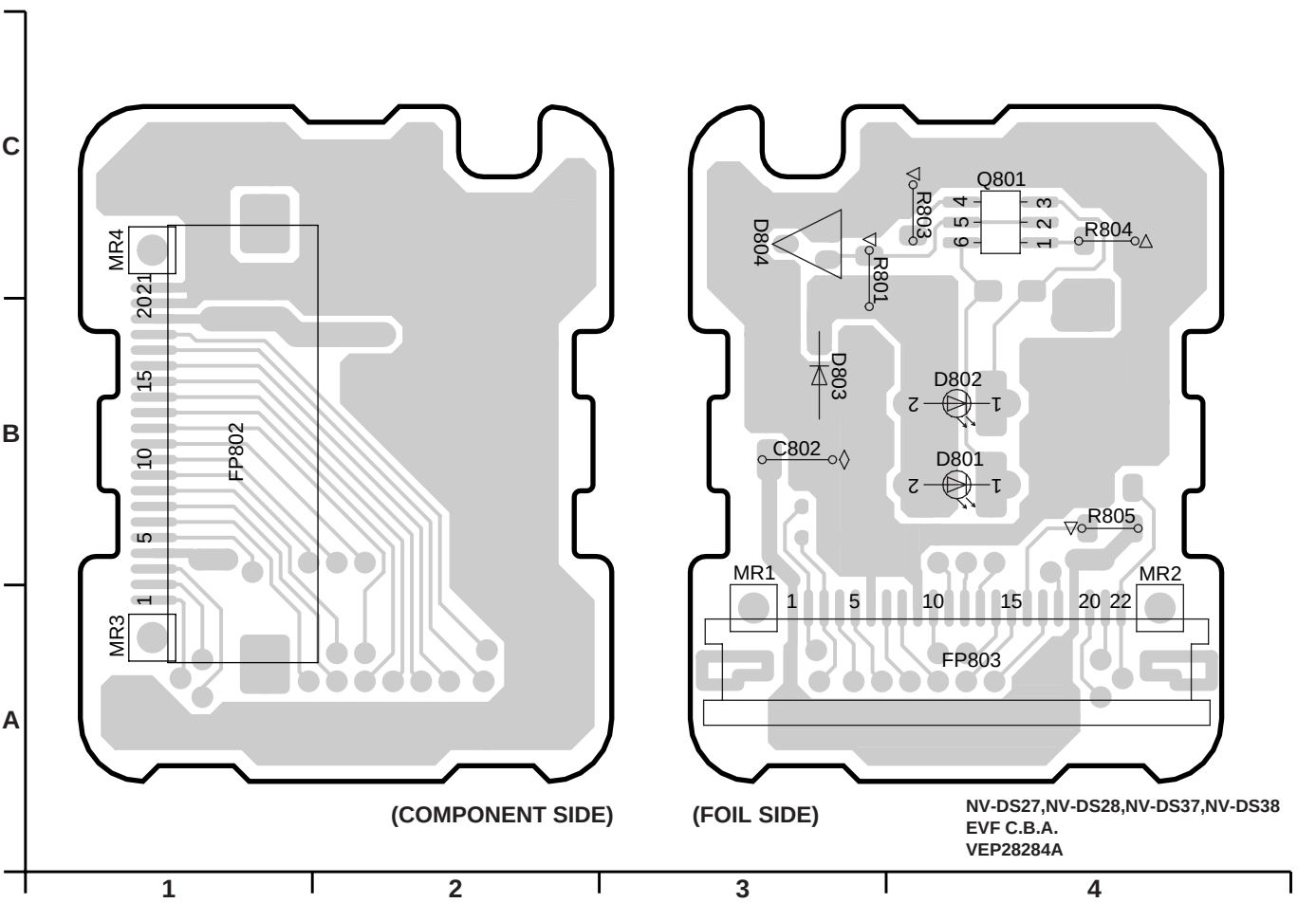


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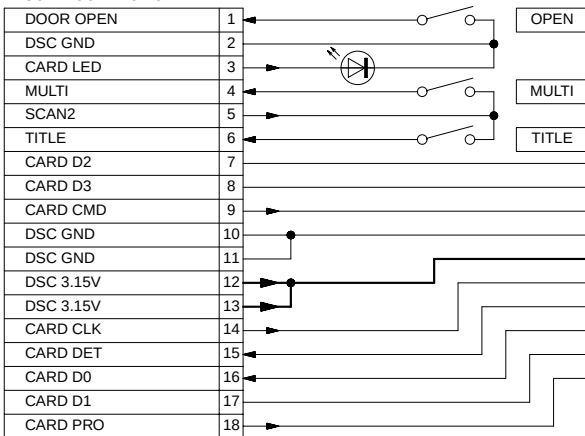
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3

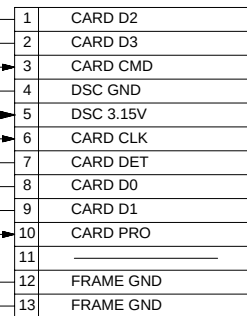
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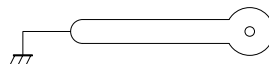
TO
DSC EX CONNECTION



TO
CARD



TO
FRAME GND



NV-DS27,NV-DS28,NV-DS37,NV-DS38

SIDE CASE R UNIT(DSC FLEX.)SCHEMATIC DIAGRAM(NV-DS37,NV-DS38 ONLY)

1

2

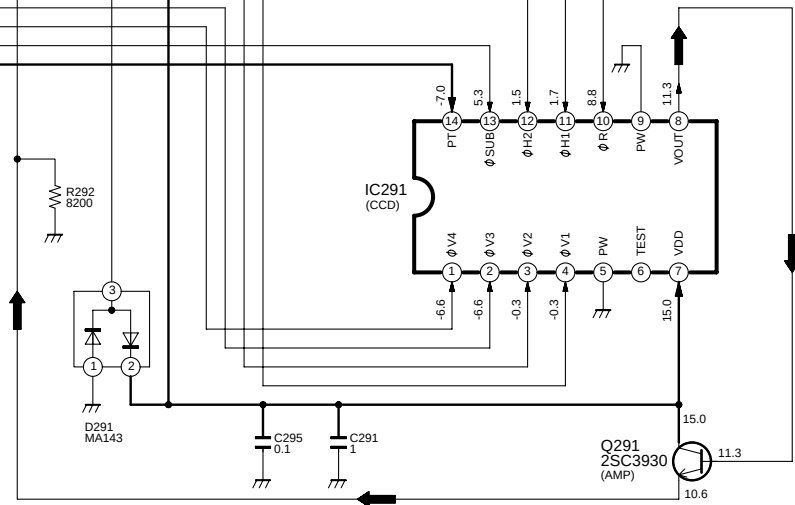
3

TO
MAIN CONNECTION
PS291

➡ :VIDEO MAIN SIGNAL PATH

H2	1
H1	2
R	3
PW	4
PW	5
PW	6
OUT	7
15V	8
V1	9
V2	10
V3	11
V4	12
SUB	13
-7V	14

TO
PP201



NOTE:
DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC
DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE
REFER TO PARTS LIST.

NOTE:
THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS
DIAGRAM IS STOP MODE.

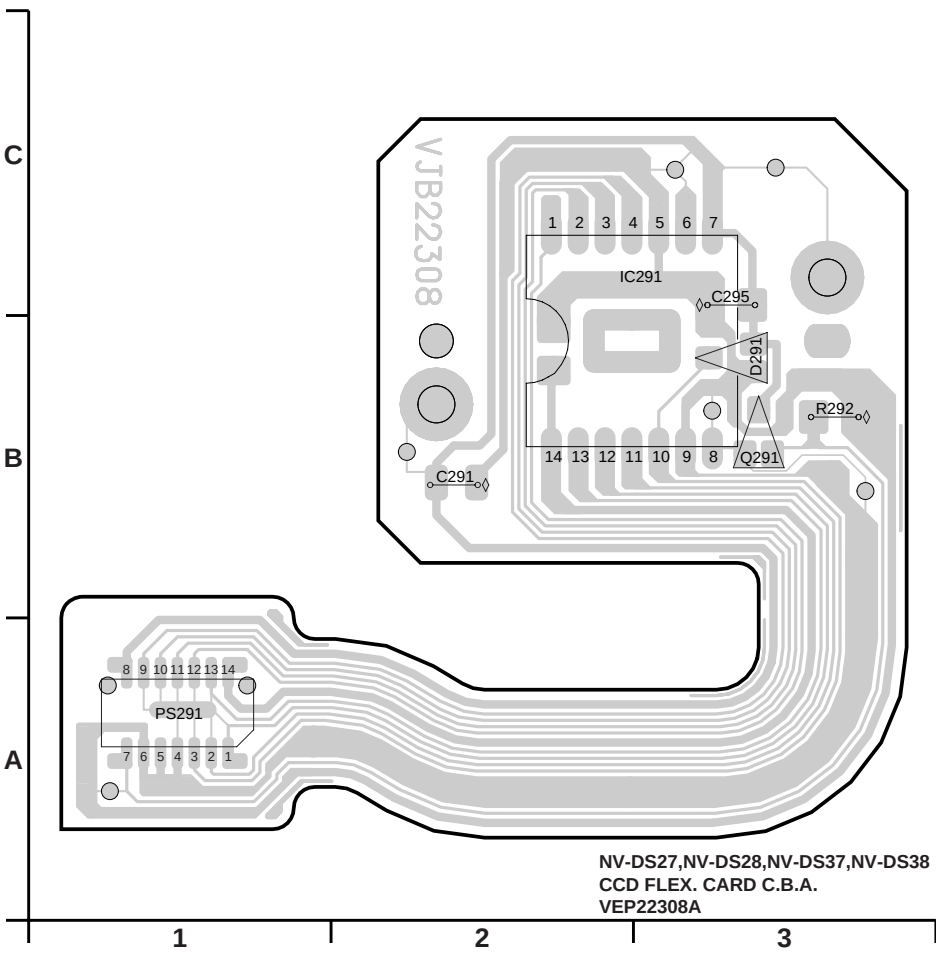
NV-DS27, NV-DS28, NV-DS37, NV-DS38 CCD FLEX. CARD SCHEMATIC DIAGRAM

1

2

3

4



INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO	ABBREVIATIONS
	VMODE VMVH VORP VRB VRBS VREF1R3V VREF3R3V VREFH VREFL VRI VRO VRT VRTS VS VSS VSSX VSSXY	NTSC/PAL Select Switch VH Filter Switching Video Overlap Voltage Reference Bottom Voltage Reference Bottom Output Reference Voltage 1.3V Reference Voltage 3.3V Reference Voltage High Side Reference Voltage Low Side Reference Voltage Input Reference Voltage Output Voltage Reference Top Voltage Reference Top Output Switching Comparator Vertical Sync Signal X Driver Power for Colour LCD X-Y Driver Power for Colour LCD		
W	W/N W/N WAD WAE WAERAE WARI WB WE WEM WHD WIDE A WSB WSR WTV	Mode Select for Window Mode Wide / Normal Write Address Enable Write Address Enable Write Address Enable Interrupt White Balance Write Enable Memory Write Enable Wide Horizontal Drive Pulse Wide Zoom B AGC Control R AGC Control Wide TV		
X	XP	FG Logic Reset		
Y	Y FM0-7 YCE YGC YMO 0-7 YNCST YNR YSDP 0-7	Y Field Memory 0-7 Cylinder Error Code Y Gain Control Y Field Memory 0-7 Noize Canceller Luminance Noise Reduction Digital Y Out 0-7		
Z	Z.ENC Z.MIC ZENC ZMDIR ZMEN ZMT ZMT (+)/(-) ZMTER ZMW ZSW	Zoom Encoder Zoom Mic Zoom Encoder Output Zoom Drive Zoom Enable Zoom Motor Tele Side Zoom Motor (+)/(-) Zoom Motor Tele Side Zoom Motor Wide Side Zoom Switch		

INITIAL/LOGO		ABBREVIATIONS		INITIAL/LOGO		ABBREVIATIONS	
	RENCF	Lens Control (Forward) Lens Control (Reverse) Rotary Erase Head 1V Inverted Signal 1-2 Offset Voltage for AWT R Capstan Direction (Reverse / Stop / Forward) Reset R Strobe Reset Power Down Input Reset Read Reset Write Saw Tooth Terminal Resister for Oscillation Read Write Read Write Enable			SWB	Switching Pre-Drive Pulse	
	RENCR				SYL EC	Cylinder Torque Control	
	RERASE				SYL FG	Cylinder FG	
	RGBIV1-2			T	T PHOT	Take-up Photo Transistor	
	RGO R/G OFF				TBC	Time Base Conntrol	
	RSF				TFT	Thim Film Transistor	
	RST				TH	Thermostat for Battery	
	RSTB				TI	Test Mode Select	
	RSTPWD				TL	Torque Limit	
	RSTR				TM	Sub Code	
	RSTW				TMD	Sub Code Data	
	RT				TRE	Tracking Error Signal	
	RVCO				TREEL(P)	Take-up Reel (Pulse)	
	RW				TRFIX	Tracking Fix	
	RWAE				TRIWAVE	Tracking Wave	
					TRP	Tracking Position	
					TRP	Trap	
					TSR	Head Switching Refference	
					TST	Time Scale Transfer	
S	S PHOT	Supply Photo Transistor Sampling Hold Start/Stop Serial Data Serial Data Input Serial Data Output Serial Clock Key Scan 0-5 Serial Clock Search Still Cue Review Segment White Balance Set Shutter/Iris Control Capasitor for Phase Shift Serial Data Input Shift In Clock Input Serial In/Out Control Shaffling Memory Chip Enable Shaffling Memory Read Strobe Shaffling Memory Write Enable Shaffling Memory Read Strobe Snap Shot Sensor LED Serial Data Output ATF Smapling Pulse 8 Bit Shift Register Enable Speaker Reset for Switching Power 8 Bit Shift Register Strobe Supply Reel Pulse Start Start Sync block Area Select Signal for Low Pass Filter Safety Tab 5V Safety Tab Switch Stand by Signal Strobe		U	U/V SEL	R-Y/B-Y Select Signal	
	S/H				UNLOAD	Un-Loading	
	S/S				UNRE	Microprocessor Read Enable	
	SBD				UNWE	Microprocessor Write Enable	
	SBI				UV	R-Y/B-Y	
	SBO				UV SEL	R-Y/B-Y Select Signal	
	SBT						
	SCAN0-5						
	SCK			V	V1-V4	V. CCD Drive Pulse	
	SCR				VB	VH Filter Switching	
	SCR, S.C.R.				VCE	Power Terminal	
	SEG.				VCNTL	Video Control	
	SET				VCO	Voltage Control Oscillator	
	SH/IRIS				VCP	Shift Clock Output for Vertical Drive	
	SHIFT				VCTLD	Video Control	
	SI				VCTRL	Voltage Charge Control	
	SIC				VD	Vertical Drive Pulse	
	SIOC				VDDX	X Drive Power for Colour LCD	
	SMCE				VDDXY	XY Drive Power for Colour LCD	
	SMRS				VDDY	Y Drive Power for Colour LCD	
	SMWE				VDREC	Video Delayed Rec	
	SMWS				Vgg	Voltage for Gate IC	
	SNAP				Vgl	Gate off Voltage	
	SNS LED				VID	Video Signal Out	
	SO				VIN	Video In	
	SPA				VITC	Vertical Interval Time Code	
	SPEN				VITERBI	One of Signal Detection Method	
	SPK				VL	Low Voltage	
	SPO				VLC	Variable Length Cording	
	SPST				VLOCKP	Artificial Sync Pulse	
	SREELP				VLP	Artificial Sync Pulse	
	SRT				VM	Motor Voltage	
	SSA				VMD	Velocity Mode Data	
	SSW				VMD1-3	Electric Shutter Mode	
	ST5V						
	STAB						
	STB						
	STB						

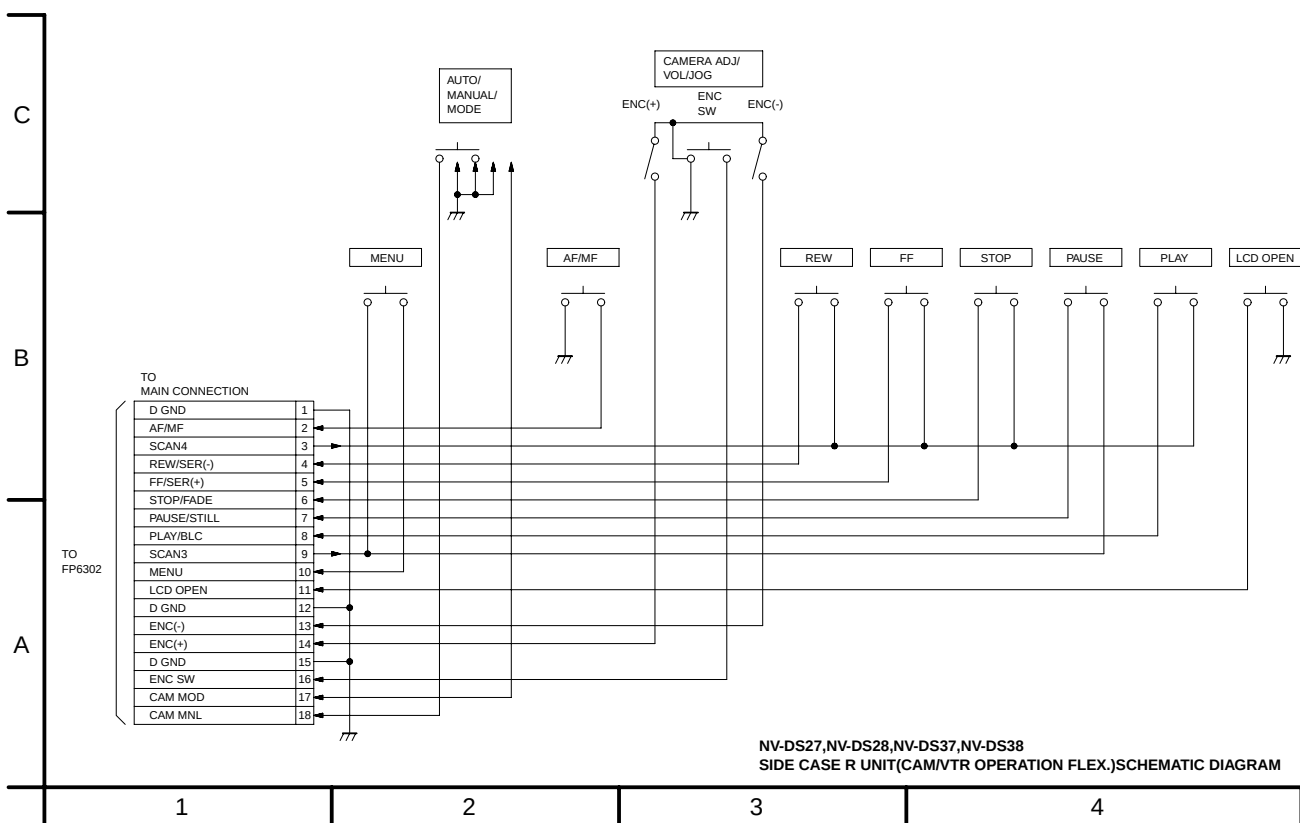
INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	LVL	LPF Switch for Auto Focus	P	P SW	Power Switch
M	M1-3	Motor Coil Terminal 1 to 3		PB1-3	PNP Base 1-3
	MA0-5	Microprocessor Address Data 0-5		PBCTL	Play Back Control
	Mbps	Megahertz Bit Per Second		PBCTL	Pre-Branking Control
	MD	Modulation		PBH	Head Amp Switch
	MD0-7	Microprocessor Data 0-7		PBLK	Pre-Blanking (Pulse)
	MDT0-7	Microprocessor Data 0-7		PC1-3	Corrector of PNP Transistor
	ME (TAPE)	Metal Evaporated (Tape)		PCBM	Carrier Balance
	MENB	Focus Motor Enable		PCH	Phase Compensator (Hall AMP)
	MFF	Manual Focus Far		PCI	Phase Compensator (Current)
	MFN	Manual Focus Near		PCO	Phase Compensator Out
	MHSYNC	Monitor Horizontal Sync Signal		PCS	Switching Power Control
	MIC	Memory In Cassette		PCV	Phase Compensator (Voltage)
	MIG	Meta In Gap		PE	Emitter of PNP Transistor
	MIX N.R.D.	Non Rec Data Mix		PED	Pedestal
	MOD	Modulation		PEDECNT	Pedestal Control
	MOUT	Mic Out		PENO	Alarm (L)
	MP (TAPE)	Metal Particle (Tape)		PFP	Pilot Frame Position
	MPEG	Moving Picture Image Cording Experts Group		PGA, B	Power Ground A, B
	MPEG2	Moving Picture Image Cording Experts Group Phase 2		PGC	Pulse Generator Comparator
	MRST	Focus Motor Reset		PGI	Pulse Generator Input
N	MSB	Most Signal Bit		PGMM	Pulse Generator Monostable Multivibrator
	MVSYNC	Monitor Vertical Sync Signal		PGO	Output of Pulse Generator AMP
	N/F	Near/Far Focus		PMODE	Select Signal for Normal / Wide Screen
	N/P	NTSC/PAL		PON	Power On
	NB1-3	Base for NPN Transistor		POR	Power On Reset
	NC	No Connection		POSCOM	Common Position
	NC1-3	Corrector of NPN Transistor		PREAMP	Pre-AMP
	NCLR	Power On Reset		PREBLK	Pre-Blanking
	NCP1	Clamp Pulse		PT	Protect for V Voltage
	NCP2+VDH	Clamp Pulse + Horizontal Drive Pulse		PWM	Pulse Width Modulation
	NCP2+VDM	Clamp Pulse + Gate Pulse	Q	Q2H	Source Output Select
	NDE	Non Liner De-Emphasis			
	NE	Emitor of NPN Transistor	R	R CTL P	Recorded Control Pulse (+)
	NLE	Non Liner Emphasis		R CTL R	Recorded Control Pulse (–)
	NR	Noise Reduction		R/B	Read/Busy
	NRD	Non Rec Data		R/L	Direction Control for Data Transmition
	NRD BLK	Non Rec Data Blanking		RA	Recording AMP
	NRD CLK	No Rec Data Clock		RA1	Rec AMP 1
	NRE	Read Enable Input (Low Active)		RAC AC	Rec Audio Current
O	NWE	Write Enable (Low Active)		RAD	Read Address Data
	OB	Optical Black		RAE	Read Address Enable
	OBCNT	Optical Black Control		RB	Read Busy
	OBREF	Reference Voltage for Optical Black Control		R-B	R Bias
	OE	Output Enable		RCB	R Carrier Balance
	OFH	Horizontal Counted Down Clock Signal (Reference)		RE	Read Enable
	OFS	Offset		RE(F), (S)	Rotary Erase Head Transformer
	OP	Operation AMP Output		REB	R Bias
	OSD	ON Screen Display		REC CC	Rec Current Control
	OVL	Overlap Pulse		REC CCNT	Rec Current Control
	OZ	Optical Zoom		RECCTRL	Recording Control Pulse
				RECI	Rec Amp Switch

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	EQ EVF EXT DC EXT DC(H) EXT NOREG EXT S DATA EXT SCK EZOOM	Equalizer Electric View Finder External DC (AC Adaptor) AC Adaptor DC (H) AC Adaptor 6V Serial Data for Edit Serial Clock for Edit Electric Zoom		HD HDTV HEX HG HID HLT HALL IN(+), (–) HP HPF HSE HSP HSS HSW HS-WT HSZ	Horizontal Drive Pulse High Definition TV Hexadecimal Hall Gain Head Switching Pulse High Bright Signal Input Signal from Hall IC Headphone High Pass Filter Modulated Data Output Timing Pulse for Shaffling Memory Horizontal Sync Signal Head Switching Pulse High Speed Zoom High Speed Zoom
F	F ENC FACT MODE FB FC FCK FCO FENC FEND FH2B FIX OSD FLICK FM FM0-7 FMCO0-3 FMDIR FMOEM FMOEO FMT1-4 FMY00-07 FMYI0-07 FNO FPS FR FRP FRPSO	Lens F-Value Factry Mode (not used in the service) Feed Back Saw Tooth Signal In Clock Saw Tooth Signal Generator Focus Encoder Frame End Pulse FH/2 (15.625KHz / 2=7.8125KHz) Auto Tracking Off (H) Flicker Output Field Memory Field Memory 0-7 Field Memory Chrominance Out 0-4 Focus Motor Direction Field Memory Enable Field Memory Enable Focus Motor Terminal 1-4 Field Memory Luminance Out 0-7 Field Memory Luminance In 0-7 F Value Frame Reference Signal Capstan Reverse High Frame Reference Pulse Frame Start Pulse	I	I/F I-2 C ID(H) IMP INF INF INS INTER INV IOU IOV IOY IR IRDET IREF IRIS/SH IRQ ITI	Interface Inter Integrated Circuit Wide Television (H) Inter Microprocessor Protocol CCD Input Signal 1 Input Frame Signal CCD Input Signal 2 Interval Recording Inverter R-Y Analogue Signal Output B-Y Analogue Signal Output Y Analogue Signal Output Infrared Rays Imfrared Ray Detection Current Adjustment Terminal Iris / Shutter Control Interrupt Request Insert & Track Information
			J	JPEG	Joint Photographic Image Cording Experts Group
G	G1, G2, G3 GCA GCNT G-CNT GCTRL GENE GF GSW	Gap 1, 2 and 3 Gain Control AMP Gain Control AGC Adjustment Gain Control Generator FG AMP Terminal Ground for Switching Power	K	KANDO KB KEY IN KND KNEE	Digital Gain Up Carrier Balance Key Scan Digital Gain Up Luminance Compensate
			L	LCD LCD P(L) LD LDD LEDCNT LI-BATT LOAD LOAD F, R LPF LRMONO LSB	Liquid Crystal Display LCD Power On (L) Load Pulse Liquid Direct Drive LED Control Lithium Battery Loading Loading Direction (F: Forward / R: Reverse) Low Pass Filter Monoral Audio (L + R) Least Significant Bit
H	H/M/N H/N H1, 2 HAP HASW HB HBR SET HBRST HCLR HCP	Hi-Fi / Mix / Normal Hi-Fi / Normal H. CCD Drive Pulse Horizontal Aperture Head AMP Switching Pulse Hall Bias High Brightness Set High Brightness Set High Clear Shift Clock for Horizontal Drive			

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO		ABBREVIATIONS
	CRA	Pre Apature Gain Control		DISCS	Dis Chip Select
	CRST	Camera Reset		DISP	Display
	CS	Chip Select		DL	Delay Line
	CS 0-7	Chrominance Signal Out 0-7		DOBCK	Audio A/D Convertor Bit Clock
	CSEL	Clock Phase Select		DOCTL	Data Output Control Signal
	CSI 0-7	Chrominance Signal In 0-7		DODAT	Serial Data (to D/A Converter)
	CTSW	Crosstalk Switch		DOLRCK	Audio A/D Converter LR Clock
	CURR	Current		DOLRCK	L/R Clock (to D/A Converter)
	CW	Clockwise		DOMCK	Audio A/D Converter Master Clock
	CYL EC	Cylinder Motor Trque Control		DOMCK	Master Clock (to D/A Converter)
	CYL PG	Cylinder Motor PG		DQ 1-16	Memory Data
	CYL VM	Cylinder Motor Current or Power		DRAM CAS	D-RAM Colum Address Strobe
D				DRAM OE	D-RAM Out Enable
	D CLK	Digital Clock		DRAM RAS	D-RAM Read Address Strobe
	D MODE	Digital Mode Switch Signal		DREC	AV Delayed REC Start Pulse
	D01-03	Zoom 01-03		DRK	Dark (LPF Switch for Auto Focus)
	DA UV SEL	D/A Convertor U/V Select		DS1, 2	Double Sampling Pulse
	DAC	Digital Analogue Converter		DSF 0-7	Data In/Out for Shaffling Memory
	DAG	Digital Analogue Ground		DSF 0-7	Input/Output Data to Shuffling Memory (18MHz)
	DB0-7	Data 0-7		DSP	Digital Signal Processor
	DB0-7	Microprocessor Data		DSP R/B	DSP IC Rady/Busy
	DCC	DC Clamp Control		DSP-48K-H	DSP IC Clock Select
	DCCNT	DC Control		DSTB	Data Stobe Signal
	DCI	Digital Channel Cording IC		DSV	Digital Sum Variation
	DCLR	Digital Clear		DV	Digital Video
	DCP	Digital Clamp Pulse		DVB	Digital Video Broadcast
	DCS-CLK, DA	CAS & DV I/F Serial Clock		DVC	Digital Video Cassette
	DC-STP1	DCS Serial Start		DVDD	Digital VDD
	DC-STP2	DCS Serial Stop		DVIO	Digital Video Input Output
	DCT	Discrete Cosine Transform (Compression)		DVSS	Digital Ground
	DCX7	Serial Data		DX	Shift Data for X Direction (for LCD)
	DEDP 0-3	Playback Data		DY	Shift Data for Y Direction (for LCD)
	DEDR 0-3	Rec Data		DY	TFT Y-axis Shift Data
	DEMO	Demodulation		DZ	Digital Zoom
	DEMP	A/D Convertor Empahsis Control	E	E Snap	Electric Snap Shot
	DEMP	De-Emphasis		E ZM	Electric Zoom
	DFD 0-7	Encode Data In/Out Between Shaffling Memory		E2 CS or E2P CS	EEPROM Chip Select
	DFD0-7	Encode Input/Output Signal for Shuffling Memory		E2 R/B	EEPROM Rady/Busy
	DIBDCK	Bit Clock		E2P	EEPROM
	DICLK	Digital Clock		EARP	Earphone
	DIDAT	Serial Data		EC	Torque Control
	DIDAT	Serial Data Durring Digital Audio In		ECC	Error Correction Cording
	DIF	Digital Interface		ECM	Electric Condencer Mic
	DILRCK	L/R Clock		ECR	Reference Voltage for Capstan Torque
	DILRCK	Serial Clock Durring Digital Audio In		EDA	Error Correction, DCI, ATF Servo
	DIMCK	Master Clock		EE CS	EEPROM Chip Select
	DIMCK	Mater Clock Durring Digital Audio In		EE R/B	EEPROM Read (H)/Busy (L)
	DIO 1-8	Data In/Out		EEPROM	Electric Erasable Programable Read Only Memory
	DIOS	Data In/Out Select Control Signal		EIS	Electric Image Stabilizer (DIS)
	DIOS	Select Signal for Digital In/Out		EMP	A/D Convertor Emphasis Control
	DIS	Digital Image Stabilizer		ENAB	Enable
	DIS R/B	Digital Image Stabilizer Read (H)/Busy (L)		ENV	Enverope
	DIS R/B	DIS IC Rady/Busy		EOB	End of Block
	DIS/KAND	Digital Image Stabilizer/Sensitivity			

INITIAL/LOGO		ABBREVIATIONS	INITIAL/LOGO	ABBREVIATIONS
	BLKZ	Blanking Pulse for Zoom Encoder	CH1	Channel 1 (Odd Field)
	BM	Balance Modulator	CHR	Character
	BQUIET	Bus Out Control Signal	CHR BACK	Character Back-up
	BUF IN/OUT	Buffer In/Out	CHR MIX	Character Mix
	B-Y KB	B-Y Carrier Balance	CI, CO	Buffer In/Out
	B-YO	B-Y Signal Out	CI,CO	Buffer Input & Output
C	C A In/Out	Pre-Aperture In/Out	CIF	Control Signal Forward Input
	CAPSTP	Capstan Stop Flag	CIF, CIR	Positive Control Pulse, Negative Control Pulse
	C CNT	Colour Control	CIR	Control Signal Reverse Input
	C SYNC	Composite Sync Signal	CK	Clock
	C/N	Carrier/Noise	CL/CLK	Clock
	C0-7, C00-07	Chrominance Signal 0-7	CLASS	Classeffication Signal for Compress (DCT/VLC)
	CAGAIN	Aperture Gain Control	CLASS 0.1	Class Control Signal Durring DCT/VLC
	CAM	Camera	CLK135	13.5MHz System Clock
	CAM CLK	Camera Clock	CLK18	18MHz System Clock
	CAM RST	Camera Reset	CLK2	Clock 2 (824XFH: 12.875MHz)
	CAM SIOC	Camera Serial In/Out Contol	CLK246	24.576MHz Clock
	CAM T	Camera Test	CLK27	27MHz System Clock
	CAM TL	Capstan Trque Limit	CLK450	450KHz Clock
	CAP EC	Capstan Trque Control	CLKDCLK	Digital Clock
	CAP P(H)	Capstan Power On (H)	CLK-PH	Clock Phase Control
	CAP R/F/S	Capstan Reverse (H)/Stop (M)/Forward (L)	CLK-REF	Reference Clock
	CAP SW	Capstan Power Control Switch	CLP-RST-H	Clamp Reset High Signal
	CAPSTP H	Capstan Stop Flag (Stop High)	CLX	TFT X-axis Transmission Clock
	CAPVM	Capstan Motor Current	CLX, CLX1-4	Shift Clock for X Direction (LCD Panel)
	CAPVS	Capstan Motor Power Control Switch	CLY	Shift Clock for Y Direction (LCD Panel)
	CAS	Compresion, Audio Process, Shuffling/Deshuffling	CLY	TFT Y-axis Transmission Clock
	CAS	Memory Address Strobe (Active Low)	CLY FG	Cylinder FG Signal
	CASDOWN, DWN	Cassette Down (L)	CMEMO0-3	Chroma Memory Output Signal 0-3
	CB, CR	Chroma B, Chroma R	CMIX	Character Mix
	CBLK	Composite Blanking Pulse	CMO	Chrominance Memory Output
	CC	Channel Cording	COMPC	Position Detection Pulse
	CCA	Curent Drive Control	COM RDY	Serial Enable Signal
	CCA	Current Control Amp	CMODE	Camera Mode
	CCD	Charge Coupled Devise	CNCLK	Clock
	CCW	Counterclockwise	CNR	Chrominance Noise Reduction
	CD SP0-7	Digital Chroma	CNT, CONT	Control
	CDS	Correlate Double Sampling Signal	CO	Control Out
	CDS1, 2	Sampling Pulse for CCD Output Signal	CO0-7	Chrominance Output 0 to 7 (Digital)
	CE	Chip Enable	COM	Common
	CE	Control Pulse Erase	COM RDY	Serial Transmission Enable
	CEC	Capstan Error Code	COMB	Comb Filter
	C-ERA(H)	Control Erase (H)	COS EQ	Cosin Equalizer
	CFEM	Chrominance Memory Signal	CP	Clamp Pulse
	CFM	Chrominance Field Memory	CP ON(H)	Camera Power On(H)
	CFM1-4	Chroma Field Memory Signal	CP2, 20	Clamp Pulse
	CG CLK	Character Generator Clock	CP2A, CP2O	Encoder Clamp Pulse
	CG CLK DATA	Clock Generator Data	CPN	Component Signal
	CG DATA	Character Generator Data	CPOB	Clamp Pulse for Optical Blanking
	CGC	Chrominance Gain Control	CPS	Composite Signal
	CGCS	Character Generator Chip Select	CPV	Gate Scan Clock
	CGO	Character Generator Serial Data	CR OUT	Pre Apature Out
	CH	Charge	CR POW SW	Camera Remote Power On Switch
			CRA	Aperture Gain Control

INITIAL/LOGO		ABBREVIATIONS		INITIAL/LOGO		ABBREVIATIONS	
A	A GND	Analogue GND			ALC MAIN	Auto Level Control Drive	
	A HASW	Audio Head Amp Switching Pulse			ALE	Address Latch Enable	
	A HSW	Audio Switching Pulse			A-LOCK	Full Auto Switch	
	A MUTE	Audio Mute			A-MUT(H)	Audio Mute (H)	
	A ORP	Audio Overlap Pulse			ANLPTH	Analogue Loop Through High	
	A. TR	Auto Tracking			AORP	Audio Overlap Pulse	
	A0-8, 0-17	Memory Address			APCNT	Aperture Control	
	A3V2	AD Converter Reference Voltage			APS	Auto Power Save	
	AB0-4	Address Bus			ART VH	Artificial Vertical Sync	
	AB0-4, AB12-15	Address Bus Line 0-4, 12-15			AT CNT	Automatic Tracking Gain Adjust	
	ABSF	Focus Encoder Input			ATF	Automatic Track Finding	
	ACI	Analogue Channel Cording IC			ATFCLK	41.85MHz Clock	
	AD	AD Converter			ATFG	Auto Track Gain	
	AD	Auto Date, Analogue Digital Converter			ATL	Auto Lock Select	
	AD CLK	AD Clock			ATN	Absolute Track Number	
	AD REC	Audio Delayed REC			ATR OFF(H)	Auto Tracking Off (H)	
	AD0-6	Address			ATV	Advanced TV	
	AD0-6, ADR0-6	Address Data Line			AUDIO(N)	Audio (Normal)	
	ADCLK	Analogue Digital Converter Clock			AUX	Auxiliary	
	ADCNT	Analogue Digital Control			AVDD	Analogue VDD	
	ADCS	Analogue Digital Chip Select			AVSS	Analogue Ground	
	A-DET	Audio Detect			AWTB	Auto White Balance B-Y	
	ADREC	Audio Delaied Rec			AWTR	Auto White Balance R-Y	
	ADUB	Audio Dubbing					
	AE	Auto Expose		B	BACK	Back-up	
	AECNT	Auto Expose Control			BACK UP	Microcomputer Back-up	
	AEE(H)	Audio E-E (H)			BACK VDD	Back-up Power	
	AEH	Audio Erase Head			BATT	Battery	
	AEIRQ	Auto Expose Interrupt Request			BATT ALARM	Battery Alarm	
	AF/MF	Auto Focus/Manual Focus			BATT REF	Reference Voltage for Battery	
	AF DIS CS	AF DIS Chip Select			BCB	B Carrier Balance	
	A-FADE(L)	Audio Fade (L)			BCBM(B-Y)	B-Y Carrier Balance	
	AF-AMP	AF HALL Bias			BCBM(R-Y)	R-Y Carrier Balance	
	AFCS	Auto Focus Chip Select			BD0-7	REC/Play In/Out Buss	
	AFRP	Audio PLL Voltage Control			BDCK	Standard Bus Data Clock (9MHz)	
	AF-VN	Zoom Encoder V-Ref (–)			BDEN	Standard Bus Data Enable	
	AF-VP	Zoom Encoder VREF (+)			BEND	Data Block End Request	
	AGC	Automatic Gain Control			BF	Burst Flag Pulse	
	AGCCNT	Automatic Gain Control Control			BFA	Burst Flag Pulse for Encoder	
	AGND	Analogue Ground/Audio Ground			BFO/BFI	Burst Flug Input/Output	
	AGS	Anti Ground Shooting			BI, BO	Buffer Input, Output	
	AH(P) / (R)	Audio Head (Play) / (Record)			BL	Back Light	
	AHASW	Audio Head Amp Switch Pulse			BL ON	Back Light ON (L)	
	AHSW	Audio Head Switch Pulse			BL4V	Back Light 4V	
	AI, AO	Buffer Input, Output			BLC 0, 1	Back Light Y Control Out, In	
	AIBCK	Bit Clock (to A/D Converter)			BLDI/O	Back Light Drive Input/Output	
	AIDAT	Serial Data (to A/D Converter)			BLK	Blanking Pulse	
	AILRCK	L/R Clock (to A/D Converter)			BLKA	Blanking for Encoder	
	AIMCK	Master Clock (to A/D Converter)			BLKA	Blanking Pulse for Encoder	
	ALC CNT	Auto Level Control Control			BLK/O	Blanking Pulse In/Out	



ORDER NO. VMD0105012C8

Service Manual

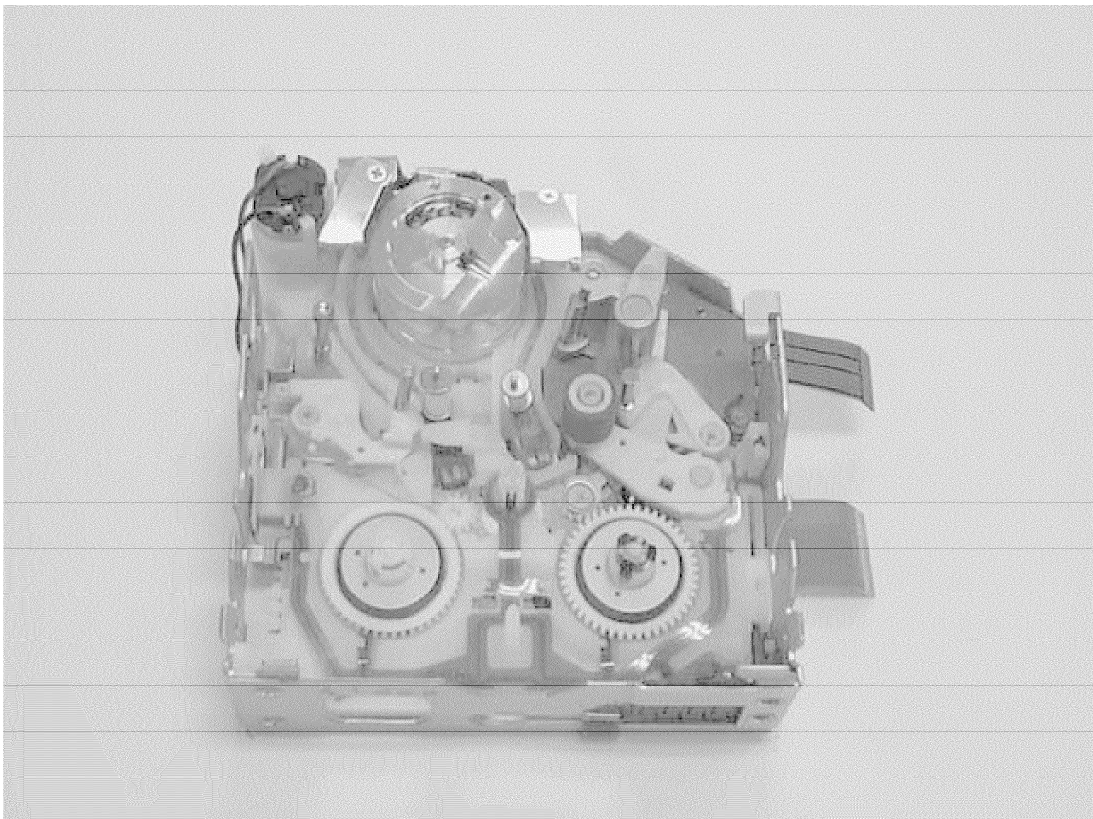
Digital Video Camera/Recorder

Panasonic Mini DV

N-MECHANISM

*Disassembly/Assembly
Procedures
Adjustment Procedures*

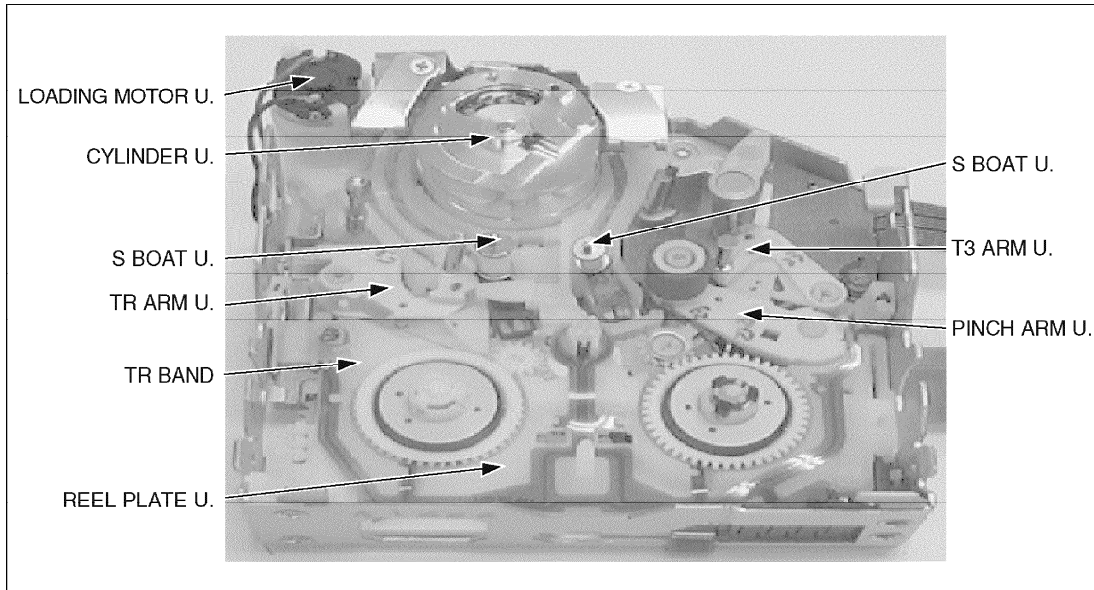
SPECIFICATIONS



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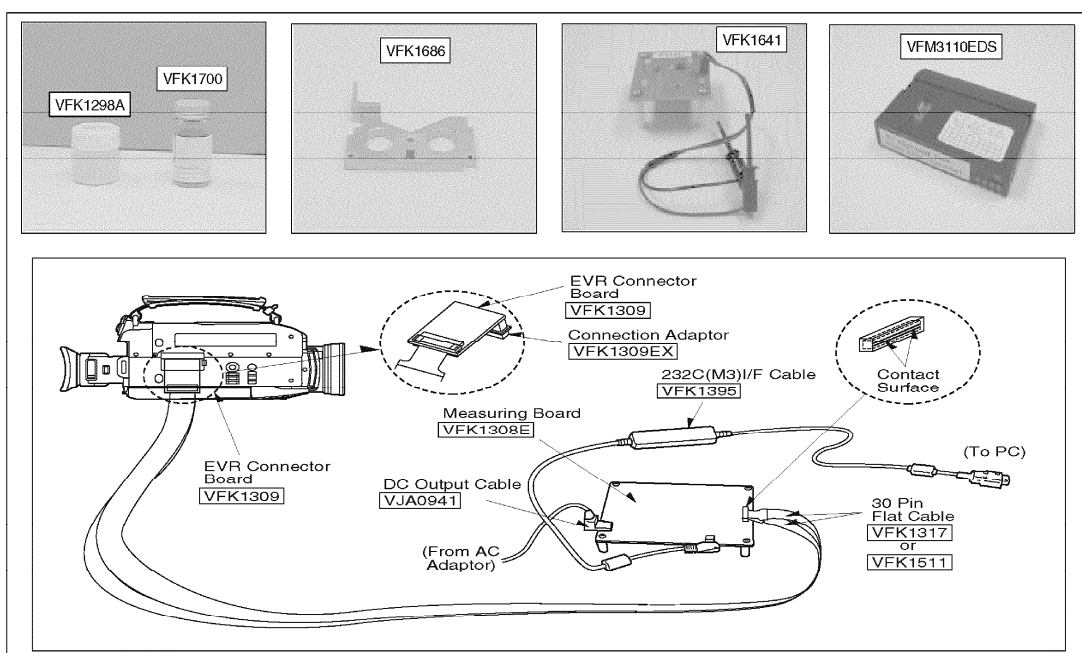
Panasonic

1. MECHANICAL PARTS LOCATION



2. SERVICING FIXTURES& TOOLS

Parts Name	Pcs	Parts No.	New	Remarks
Mechanism Oil	1	VFK1700	O	Pink
Grease	1	VFK1298A	O	White
Tension Adjustment Plate	1	VFK1686	O	
ENV Detector Board	1	VFK1641	O	
DV Alignment Tape	1	VFM3110EDS	-	PAL
232C(M3) I/F Cable	1	VFK1395	-	
Mesuring Board	1	VFK1308E	-	
EVR Connector Board	1	VFK1309	-	
Connection Adaptor	1	VFK1309EX	-	
30 pin Flat Cable	2	VFK1317	-	200mm type
		VFK1511	O	300mm type
DC Output Cable	1	VJA0941	-	



3. DISASSEMBLY PROCEDURE

No.	Item	Fig.	Procedure
1	Dumper	Fig. 1	Release Eject Lever
		Fig. 2	Release Lock(A)
2	Garage U.	Fig. 3-1	Disengage Joints(B) at S and T sides
		Fig. 3-2	Disengage Joints(C) at S and T sides (*S side first)
3	Mechanism Flexible Cable	Fig. 4	1) Desolder each terminal / 2) Release 6 Hooks(D)
4	Cylinder U.	Fig. 5-1	1)Remove 4 Screws(E) / 2)Remove Cylinder Spring
		Fig. 5-2	Remove 1 Screw(F)
5	TR Band & TR Arm U.	Fig. 6	1)Release Hook(G) / 2)Remove Tension Adj. Screw / 3)Release Lock(H)
6	Reel Plate U.	Fig. 7-1	Make full loading condition with 3V battery.
		Fig. 7-2	Release Lock(I), (J), (K), (L).
		Fig. 7-3	Release Lock(M), (N), (O), (P) (*Lock(M) first)
		Fig. 7-4	Release Lock(Q)
		Fig. 7-5	Release Lock(R), (S)
		Fig. 7-6	Take Reel Plate U. out
7	Pinch Arm U.	Fig. 8	1)Make slightly unloading with 3V battery until Pinch Arm comes off the Capstan / Shaft. / 2)Release Lock(T)
8	T3 Arm U.	Fig. 9	Release Lock(U)
9	Loading Motor U.	Fig. 10	Release Locks(V)
10	TR Rod	Fig. 11	Take TR Rod out
11	Brake Gear	Fig. 12	Take Brake Gear out
12	S-Boat U. & S-Post Loading Band	Fig. 13	Pull out S-Loading Band, S-Boat U., T-Loading Band and Boat U.
13	T-Boat U. & T-Post Loading Band		
14	Rail	Fig. 14	Release Locks(W), (X), (Y), (Z), (a)

No.	Item	Fig.	Procedure
15	Connection Worm	Fig. 15	Take Connection Worm Gear out
16	Mode SW Gear	Fig. 16	Take Mode SW, T Load and Center Gears out
17	T Load Gear		
18	Center Gear		

Fig. 1

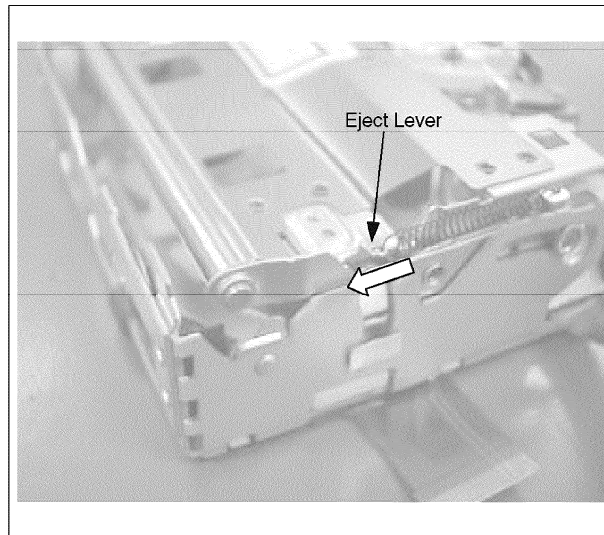


Fig. 2

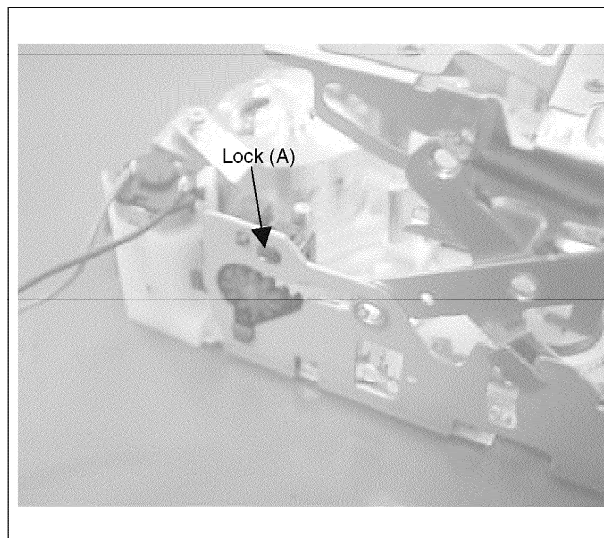


Fig. 3-1

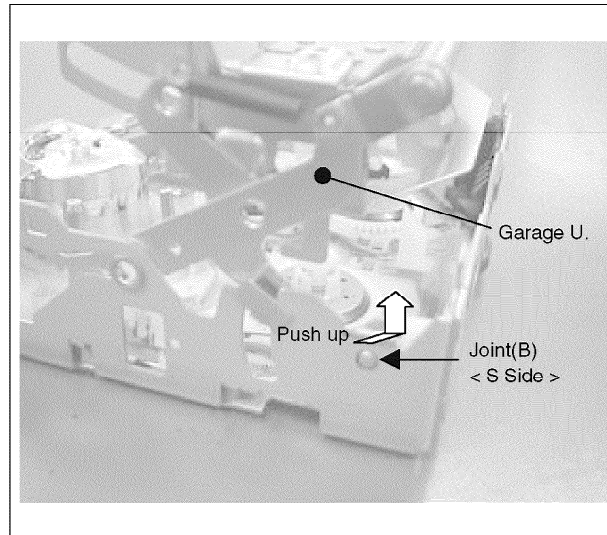


Fig. 3-2

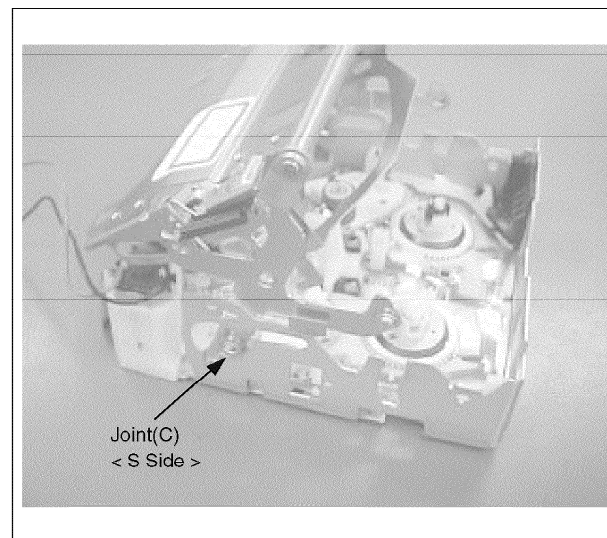


Fig. 4

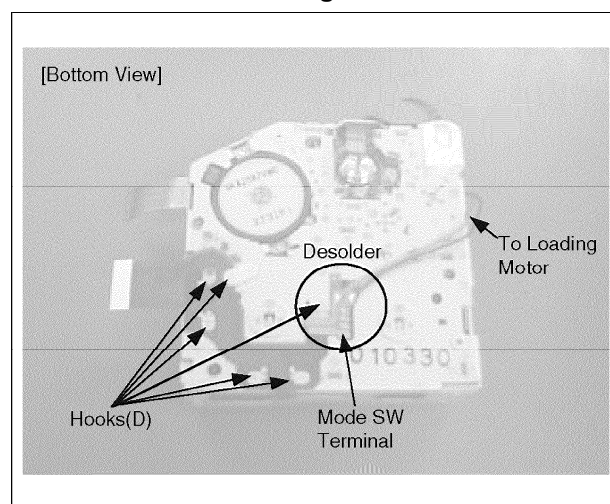


Fig. 5-1

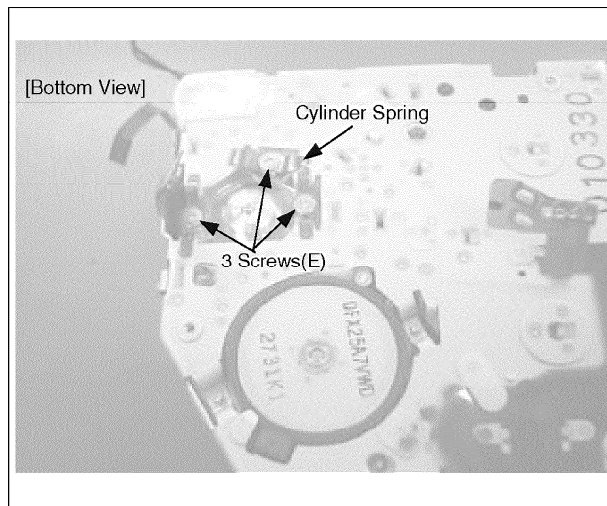


Fig. 5-2

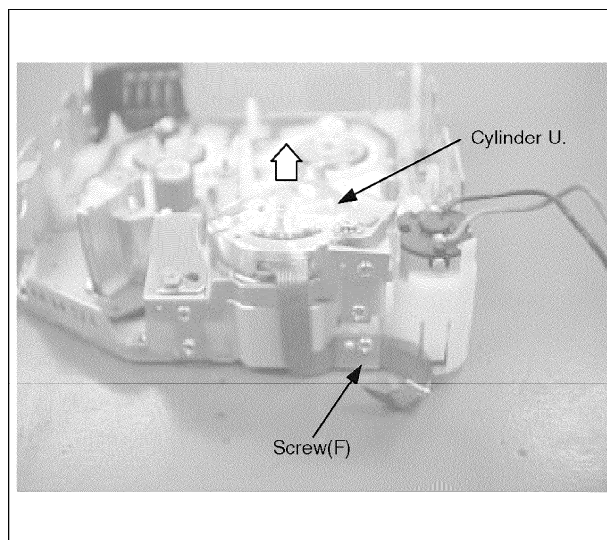


Fig. 6

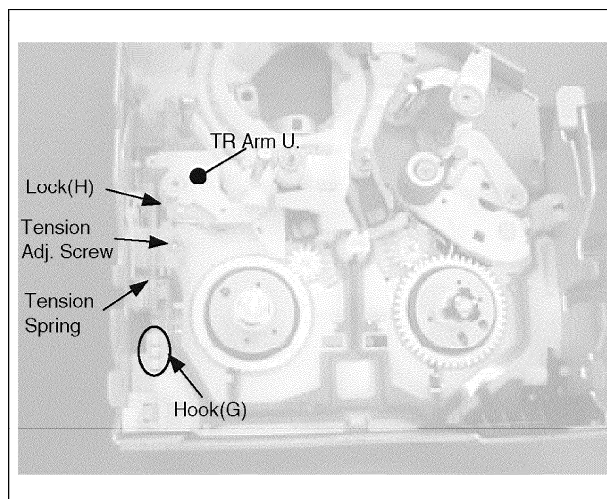


Fig. 7-1

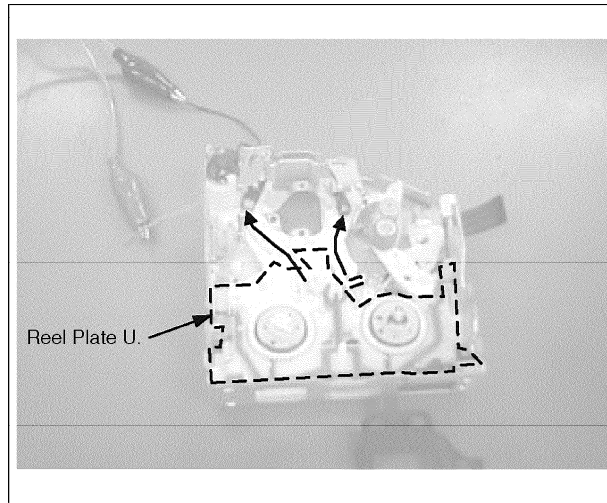


Fig. 7-2

- 1) Insert screw driver under Reel Plate for upward pressure.
- 2) Release Lock(I),(J),(K),(L).

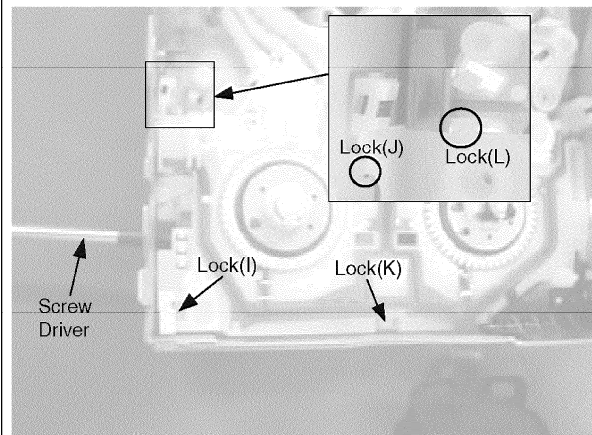


Fig. 7-3

- 1) Keep releasing Lock(L), then turn the Mechanism U. upside down with screw driver inserted (to apply downward pressure to Reel Plate in this condition).
- 2) Release Lock(M), (N), (O), (P) (*Lock(M) first)

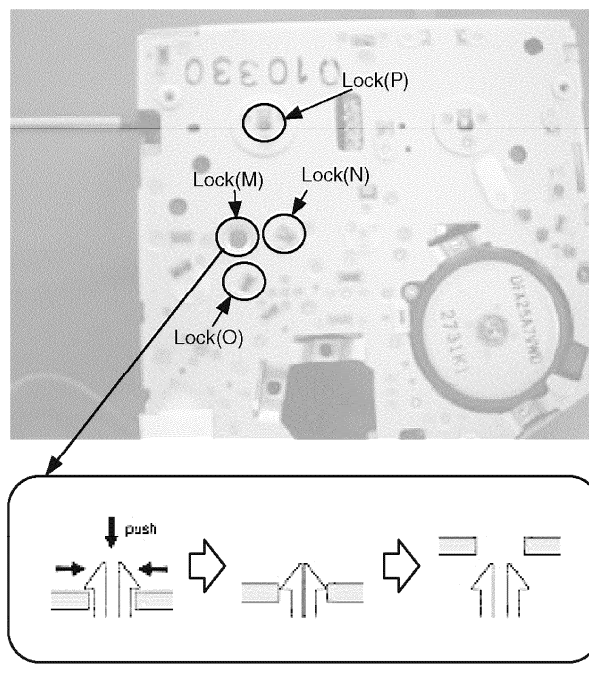


Fig. 7-4

- 1) Turn the mechanism U.
- 2) Release Lock(Q).

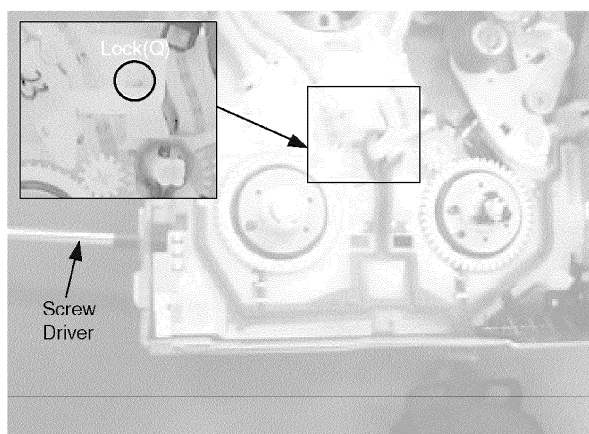


Fig. 7-5

- 1) Turn the mechanism U. again.
- 2) Release Lock(R), (S).

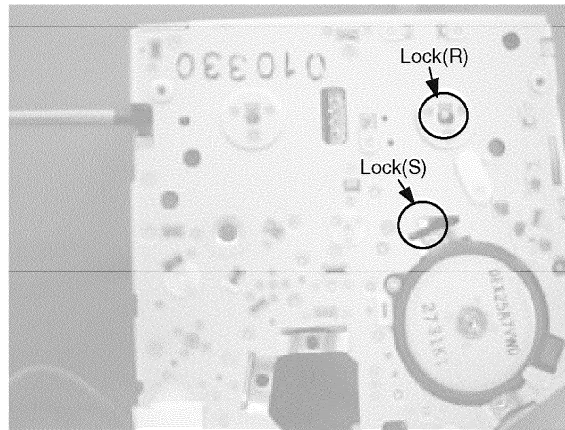


Fig. 7-6

- 1) Turn the mechanism U. again.
- 2) Take Reel Plate U. (slide and lift up).
(*Be careful for handling flat cable.)

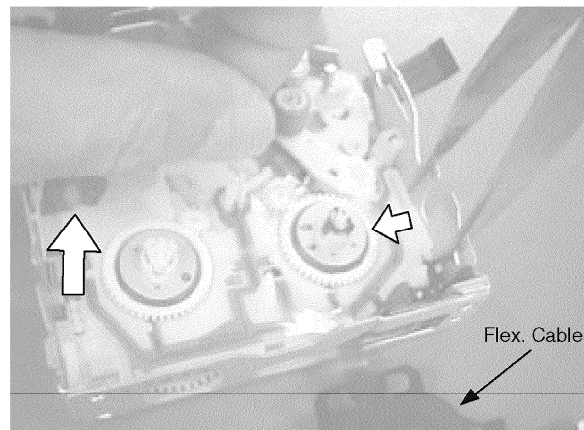


Fig. 8

- 1) Make slightly unloading with 3V battery until Pinch Arm comes off the Capstan Shaft.
- 2) Release Lock(T).

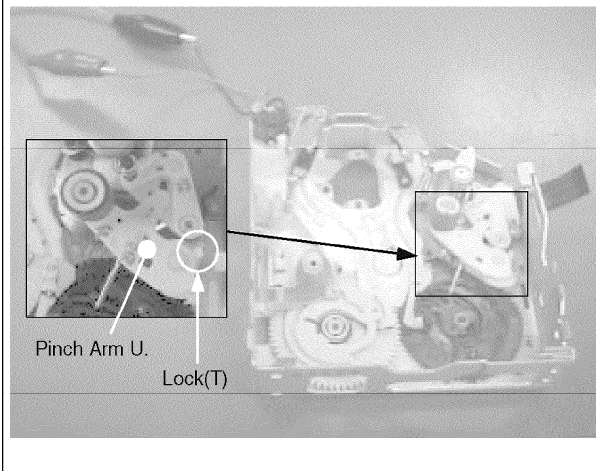


Fig. 9

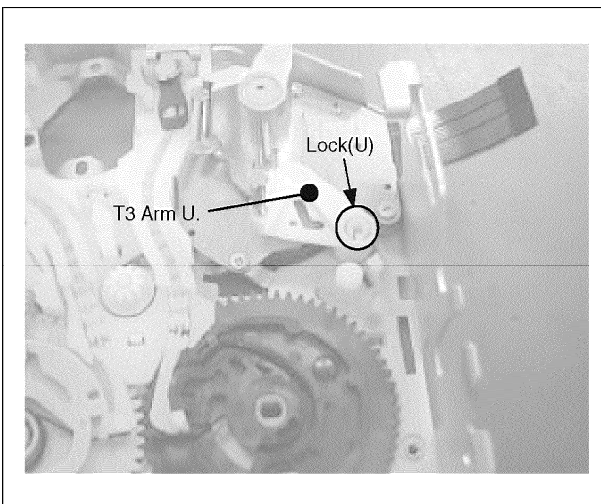


Fig. 10

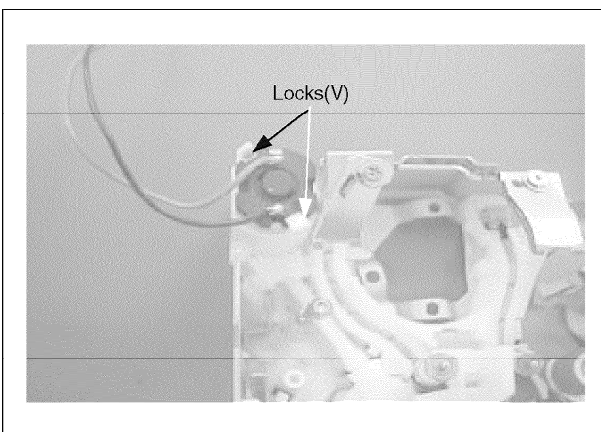


Fig. 11

NOTATION PUBLIC "-//ALDUS//NOTATION TAGGED IMAGE FILE FORMAT//EN"
ENTITY SYSTEM "d_11.tif"

Fig. 12

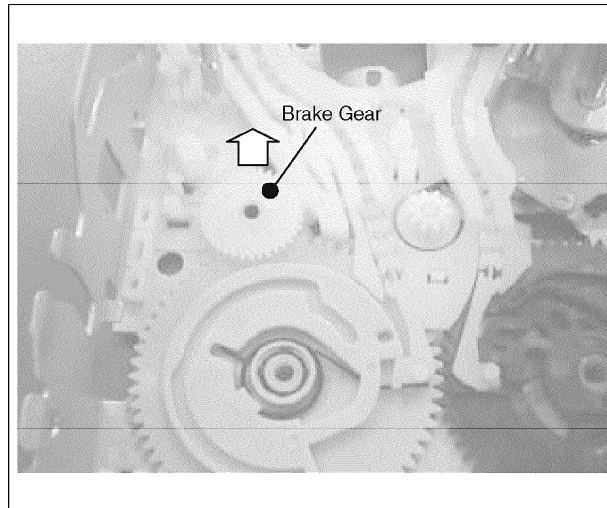


Fig. 13

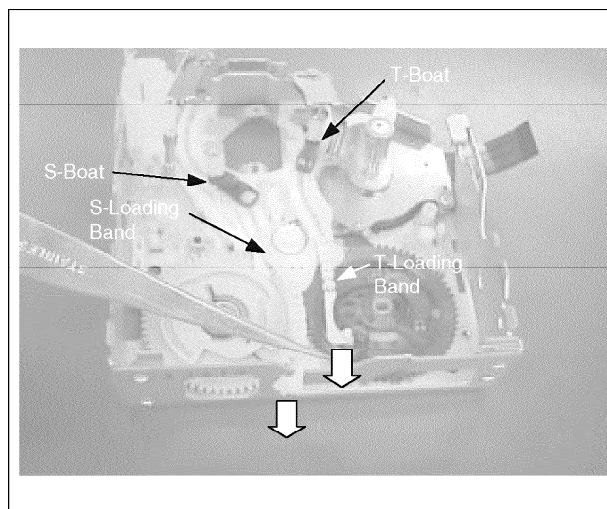


Fig. 14

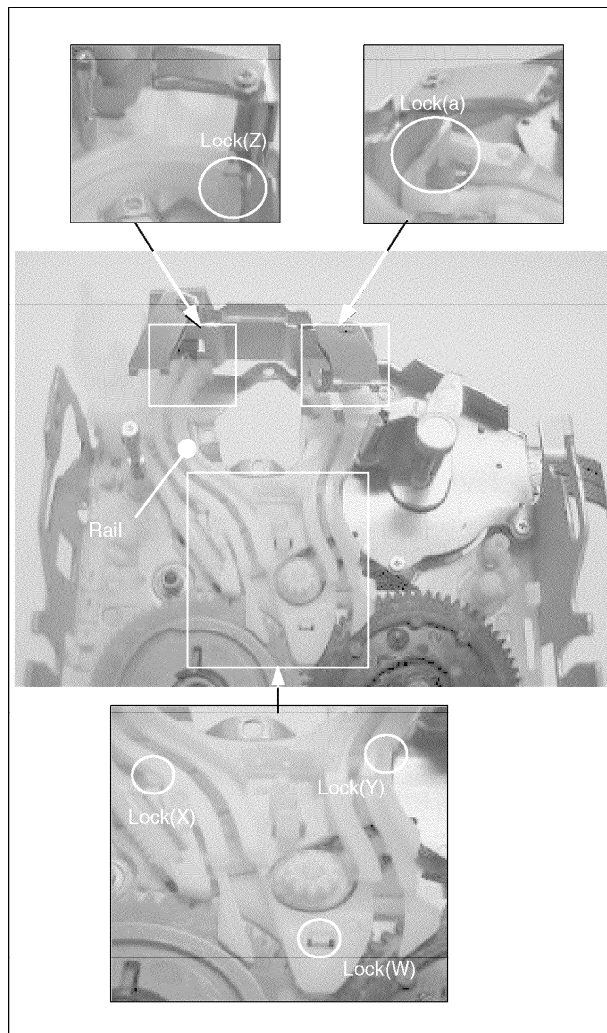


Fig. 15

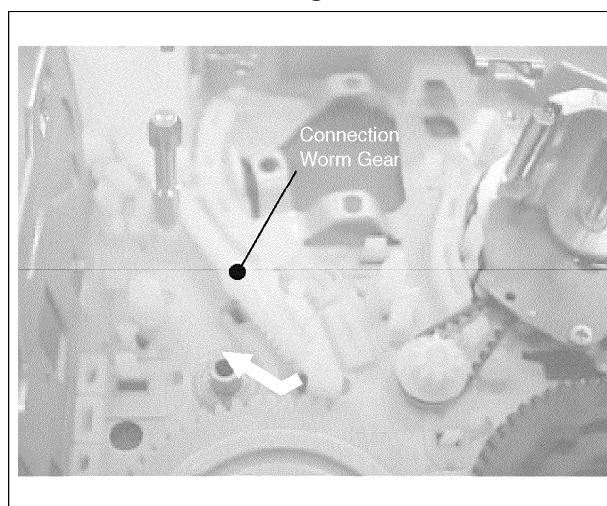
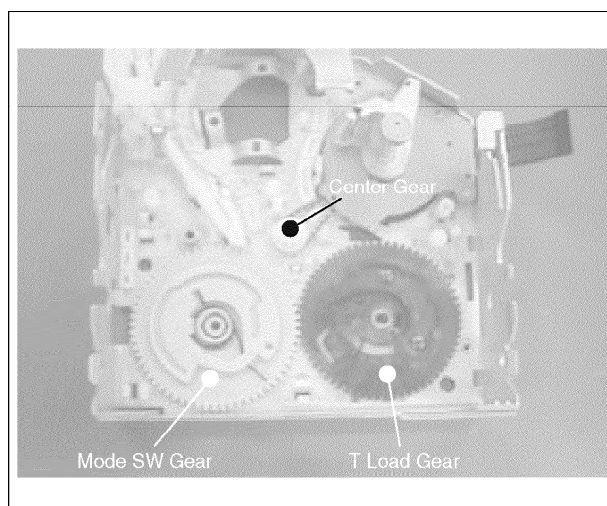


Fig. 16



4. ASSEMBLY PROCEDURE

No.	Item	Fig.	Oil & Grease	Procedure
1	Center Gear	Fig. 1	-	Install Center Gear
2	Mode SW Gear		Grease	Install Mode SW Gear
3	T Load Gear	Fig. 2	Grease	Install T-Load Gear so that triangle phase marks on Mode SW and T Load Gears meet each other.
4	Rail	Fig. 3	-	Install Rail and fix it with 5 Locks(W), (X), (Y), (Z) and (a)
5	Connection Worm		Grease	Install Connection Worm
6	S-Boat U. & S-Post Loading Band	Fig. 4	Oil / Grease	1) Install S and T-Boats together with Loading Band / 2) Connect S-Loading Band to Mode and T-Loading Band to / T-Load Gear
7	T-Boat U. & T-Post Loading Band			
8	Brake Gear	Fig. 5	-	Install Brake Gear
9	TR Rod	Fig. 6	-	Install TR Rod
10	Loading Motor U.	Fig. 7	Grease	Install Loading Motor
11	T3 Arm U.	Fig. 8	-	Install T3 Arm U.
12	Pinch Arm U.	Fig. 9	-	Install Pinch Arm U.
13	Reel Plate U.	Fig. 10-1	-	Confirm Idler position and set it into Reel Plate U.
		Fig. 10-2	Grease	Install Reel Plate U.
		Fig. 10-3	-	Fix Reel Plate U. with 11 Locks(I), (J), (K), (L), (M), (N), (O), (P), (Q), (R) and (S)
		Fig. 10-4	-	Fix Flex. Cable with 6 Hooks(D)

No.	Item	Fig.	Oil & Grease	Procedure
14	TR Band & TR Arm U.	<u>Fig. 11-1</u>	-	Connect TR Arm and TR Band
		<u>Fig. 11-2</u>	-	1) Make full unloading condition with 3V bat / 2) Install TR Arm U.
		<u>Fig. 11-3</u>	-	Adjust Tension
		<u>Fig. 11-4</u>	-	
		<u>Fig. 11-5</u>	-	
15	Cylinder U.	<u>Fig. 12-1</u>	-	1) Make full unloading condition with 3V bat / 2) Install Cylinder U.
		<u>Fig. 12-2</u>	-	Turn the mechanism and install Cylinder Spring, then tighten 3 screws(E)
		<u>Fig. 12-3</u>	-	Tighten 1 screw(F) for Cylinder Flex. Cable
16	Mechanism Flexible Cable	<u>Fig. 13</u>	-	Solder each terminal
17	Garage U.	<u>Fig. 14-1</u>	Oil	1) Engage joints(C) at S and T sides (*T side first).
		<u>Fig. 14-2</u>	-	2) Engage joints(B) at both S and T sides
18	Dumper	<u>Fig. 15</u>	-	Install Dumper

The following parts should be applied the Oil (VFK1700) or Grease (VFK1298A).

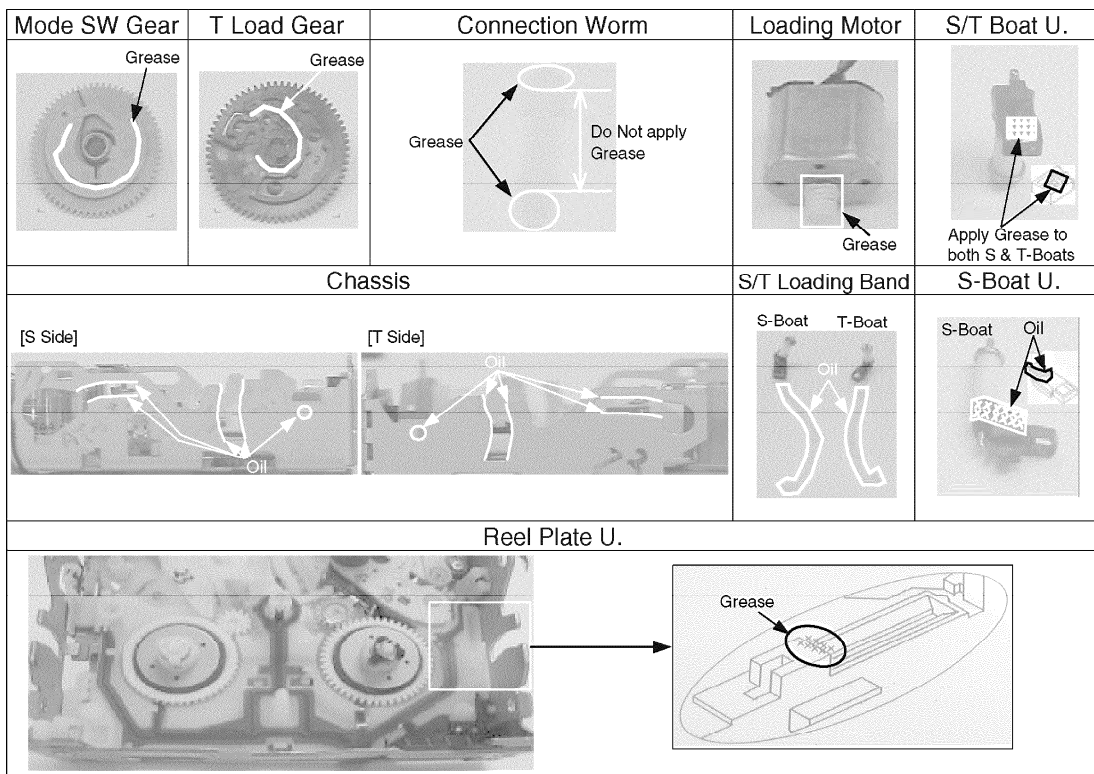


Fig. 1

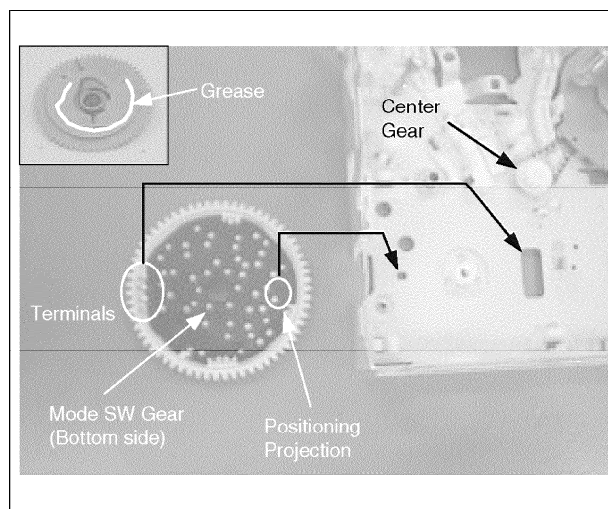


Fig. 2

- 1) Install T-Load Gear so that triangle phase marks on Mode SW and T Load Gears meet to each other.

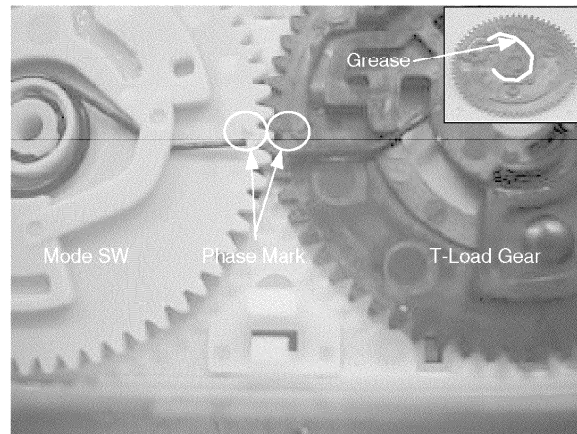


Fig. 3

- 1) Install Rail and fix it with 5 Locks(W), (X), (Y), (Z) and (a).
- 2) Install Connection Worm.

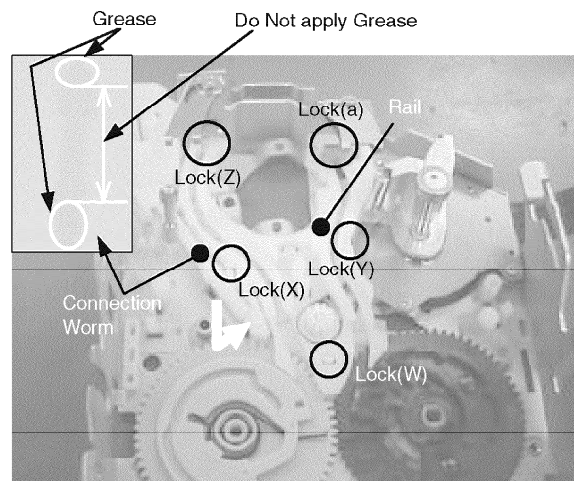


Fig. 4

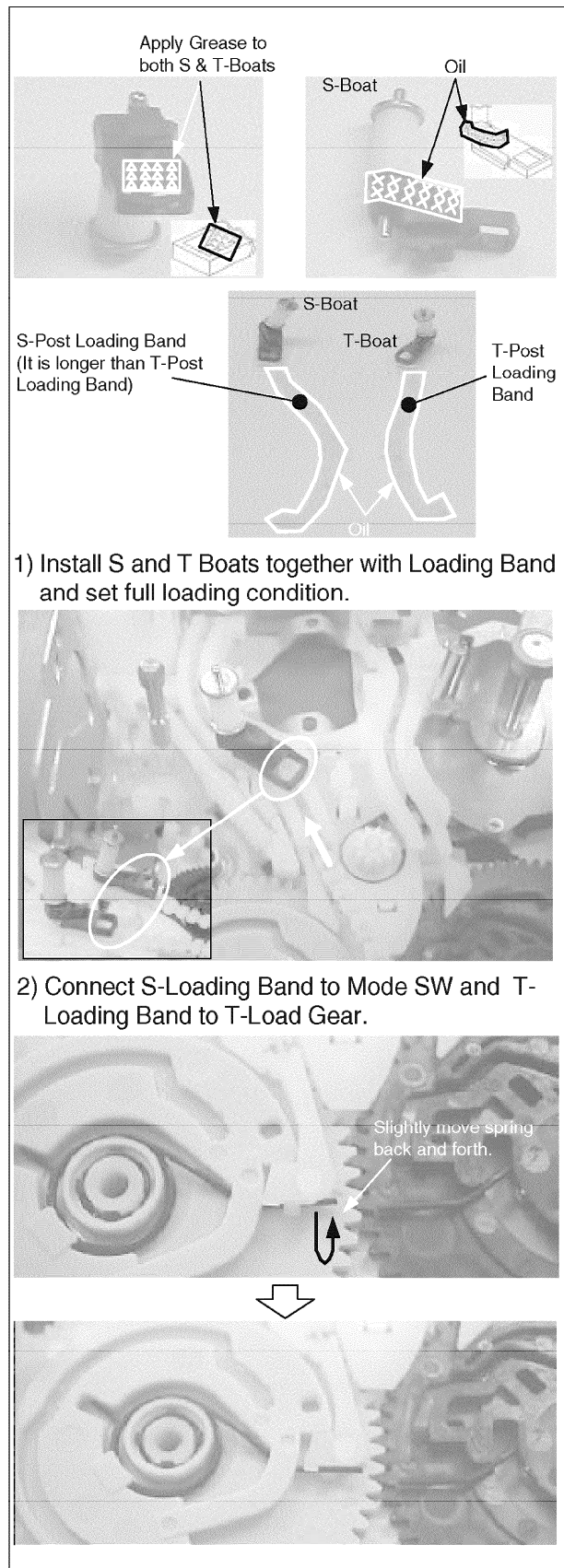


Fig. 5

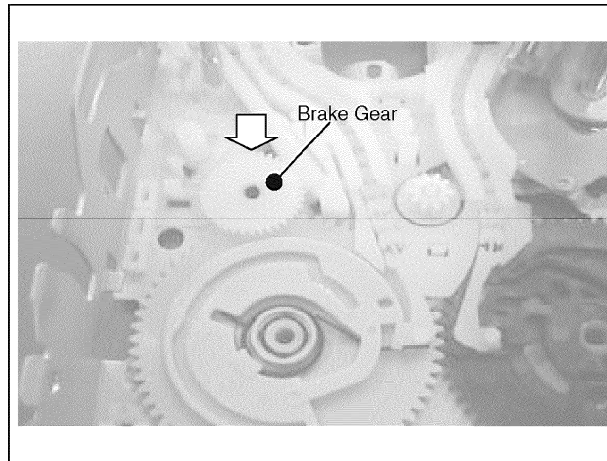


Fig. 6

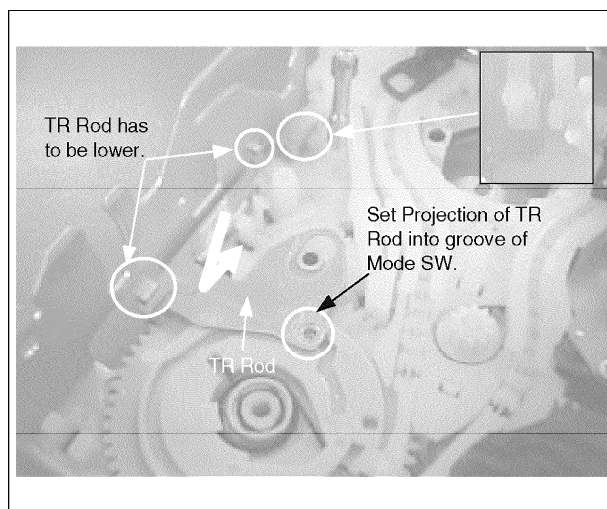


Fig. 7

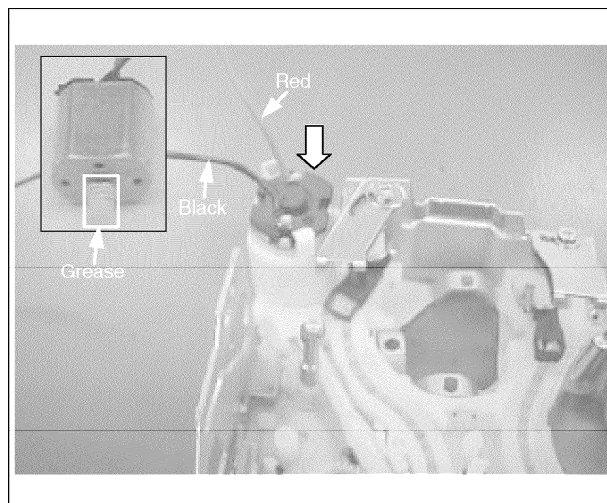


Fig. 8

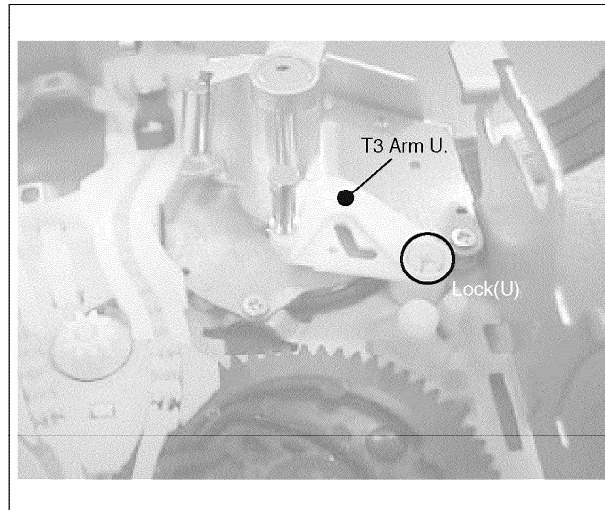


Fig. 9

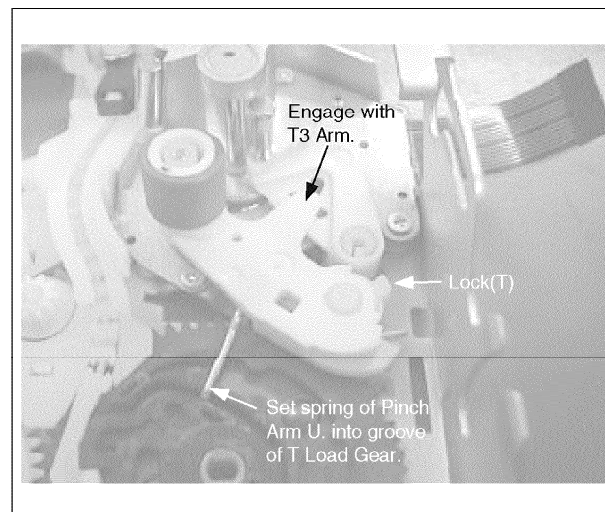


Fig. 10-1

1) Confirm Idler position and set it into Reel Plate U. if necessary.

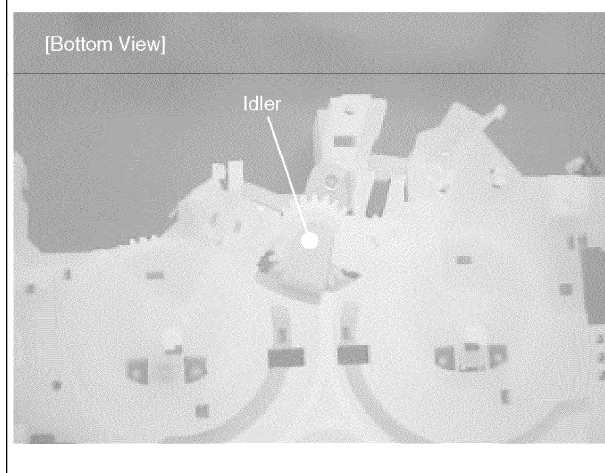


Fig. 10-2

Note:

Before installing Reel Plate U., confirm that triangle phase marks on Mode SW and T-Load Gears are meeting to each other.

If not, align the phase marks again.

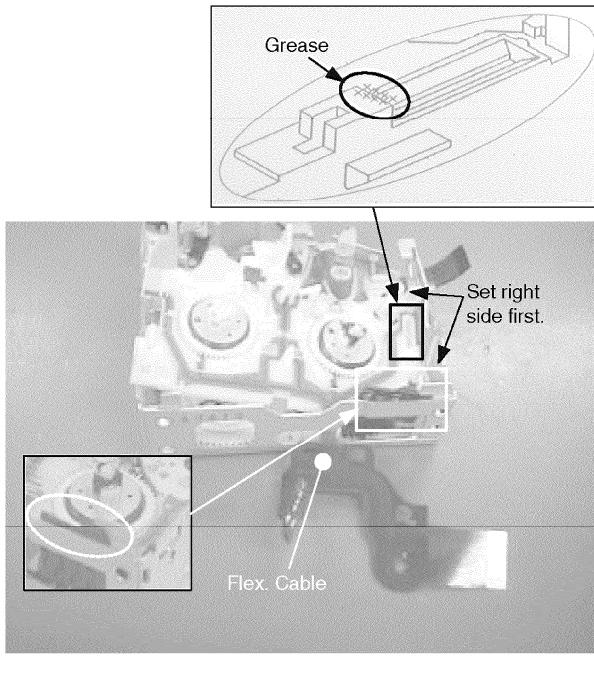
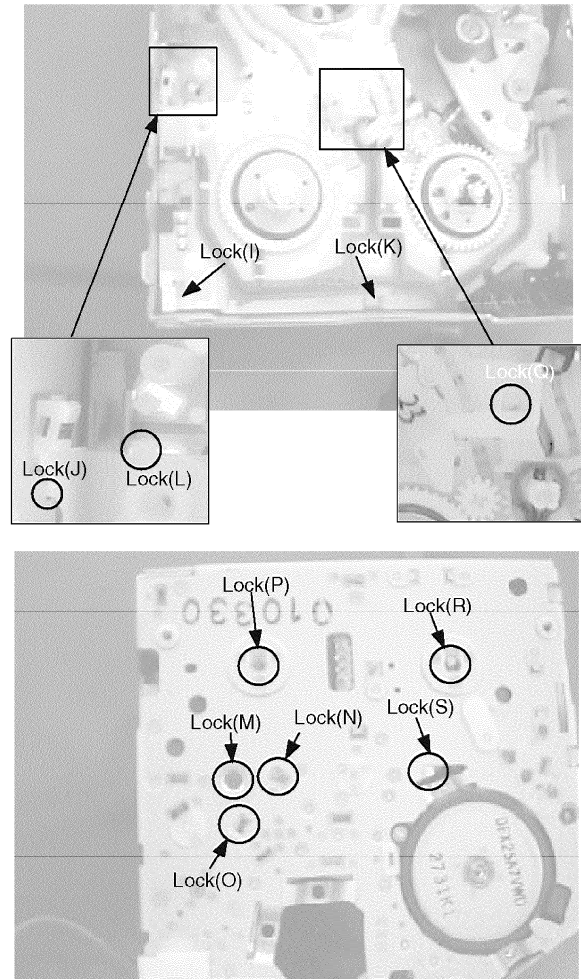


Fig. 10-3

1) Fix Reel Plate U. with 11 Locks(I), (J), (K), (L), (M), (N), (O), (P), (Q), (R) and (S).



Confirm the smooth movement of Idler by rotating Capstan Rotor manually.

Fig. 10-4

1) Fix Flex. Cable with 6 Hooks(D).

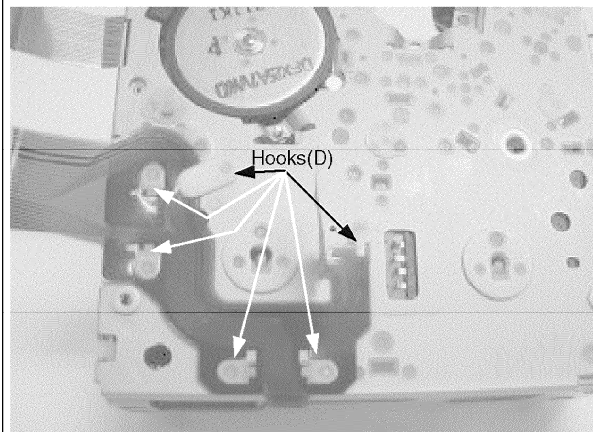


Fig. 11-1

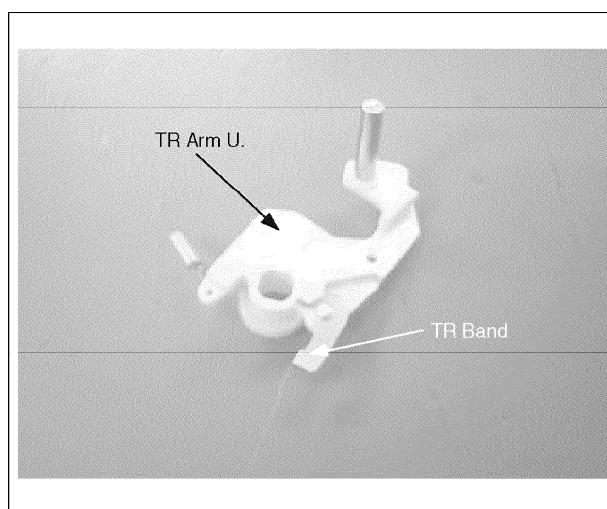


Fig. 11-2

- 1) Make full unloading condition with 3V battery.
- 2) Install TR Arm U. and fix it with Lock(H).
Note: Confirm the position of TR Arm U.
- 3) Slightly tighten Tension Adj. Screw.
Note: Do not fully tighten Tension Adj. Screw.
- 4) Hook Tension Spring to the original position.

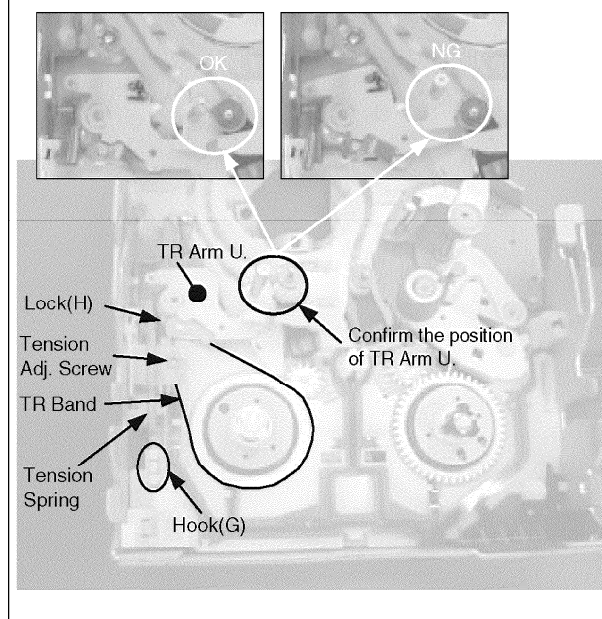


Fig. 11-3

[Tension Adjustment]

- 1) Move the mechanism position in the Play mode with 3V battery. (Play mode: Pinch Roller just touch to the capstan shaft.)

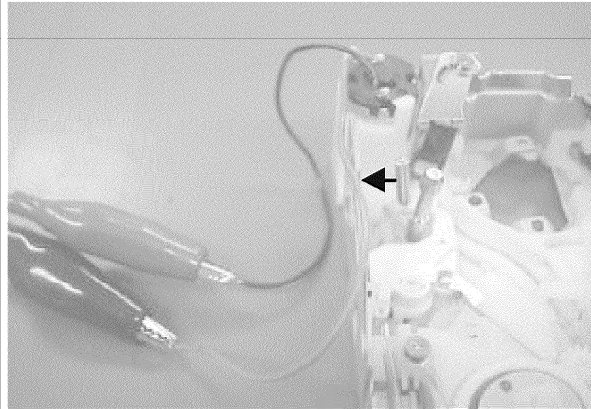


Fig. 11-4

- 2) Set the Tension Adj. Plate into the mechanism.

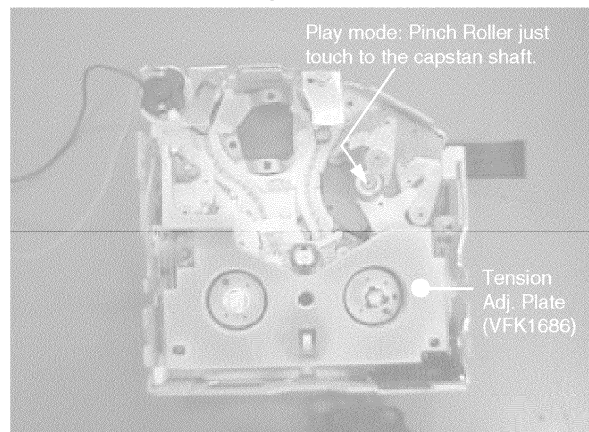


Fig. 11-5

3) Slowly turn Tension Adj. Screw counterclockwise the left edge of TR Arm shaft comes within the specification.

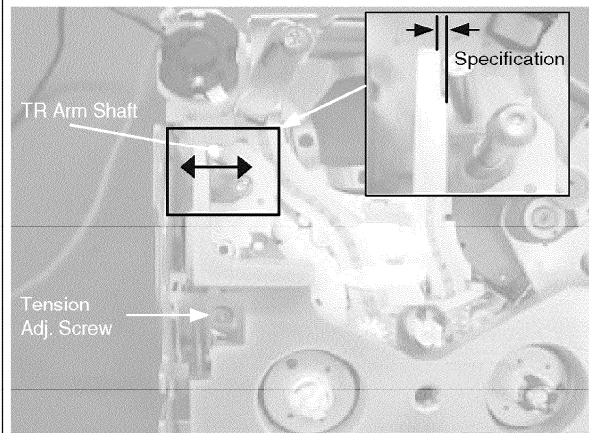


Fig. 12-1

- 1) Make full unloading condition with 3V battery.
- 2) Install Cylinder U.

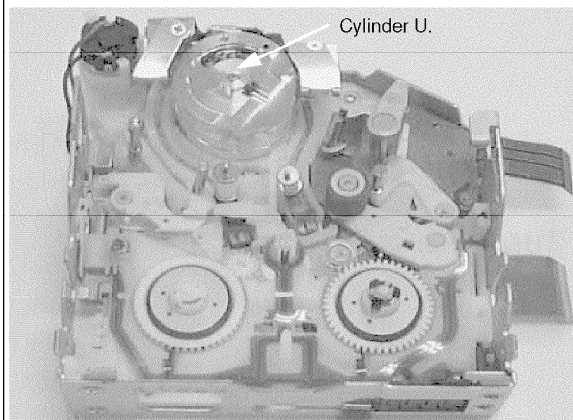


Fig. 12-2

3) Turn the mechanism and install Cylinder Spring, then tighten 3 screws(E).

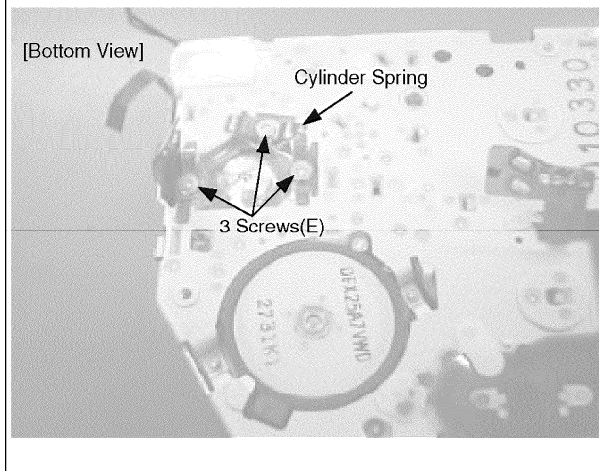


Fig. 12-3

4) Tighten 1 screw(F) for Cylinder Flex. Cable.

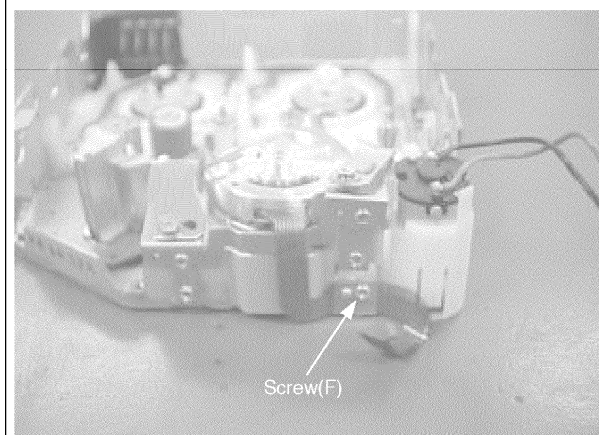


Fig. 13

1) Solder Mode SW terminal and Loading Motor Cable.

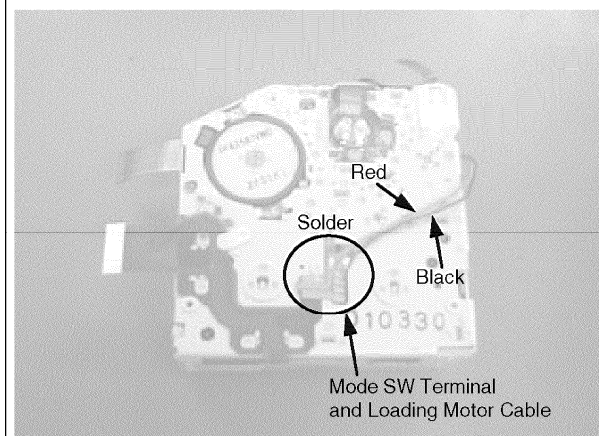


Fig. 14-1

- 1) Apply Oil to chassis, then engage joints(C)
at both S and T sides (*T side first).

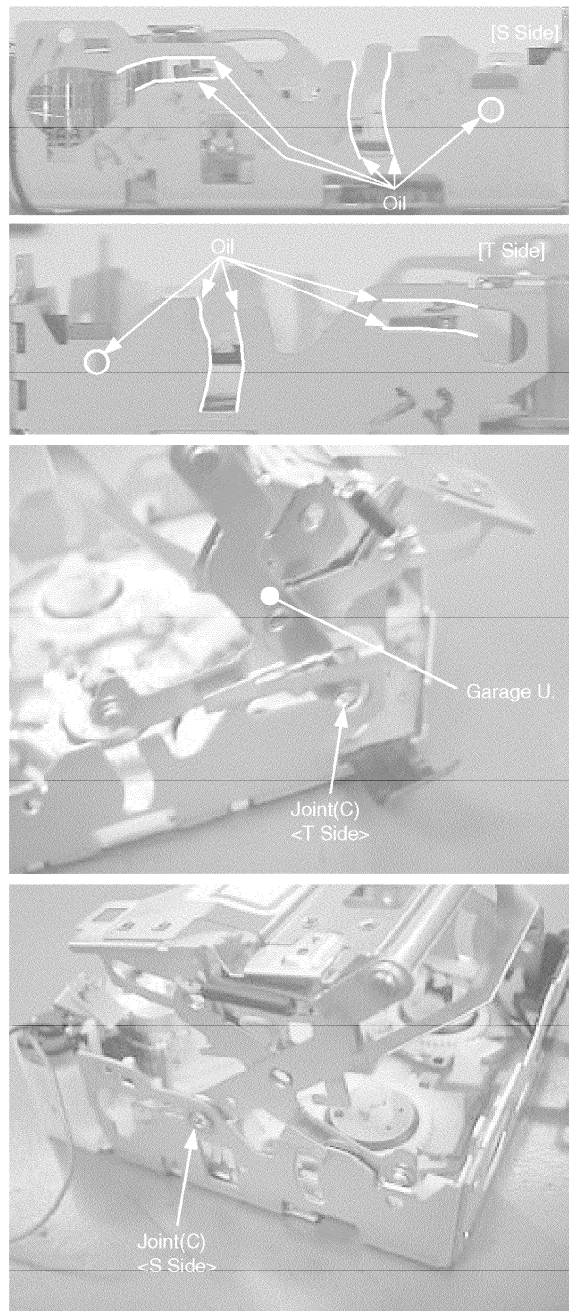


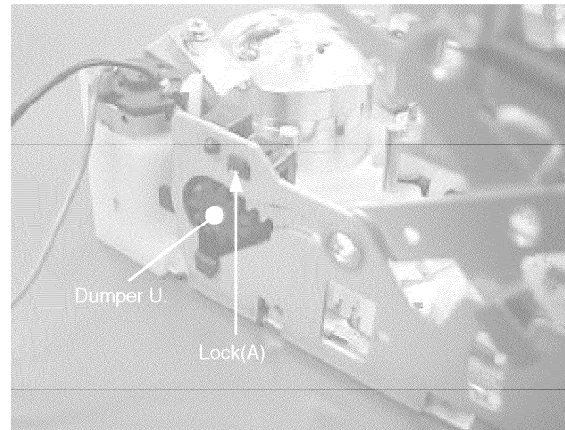
Fig. 14-2

2) Engage joints(B) at both S and T sides.

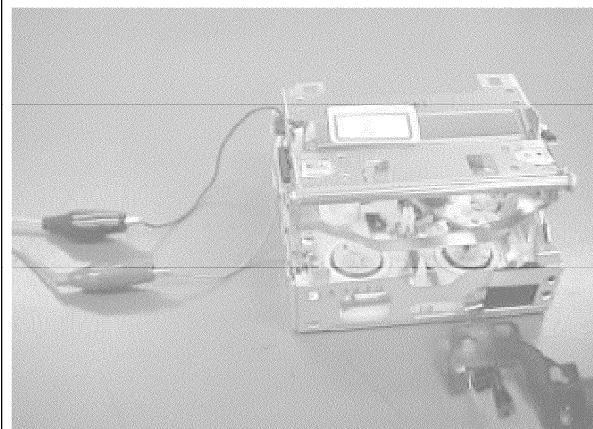


Fig. 15

1) Install Dumper U. and fix with Lock(A).



2) Make slightly loading with 3V battery to lower down the Garage U.



Note:
Finally, confirm the mechanical movement with 3V battery.

5. MECHANICAL ADJUSTMENT

5.1. ADJUSTMENT TABLE

When each mechanical part as below will be replaced, each adjustment must be done.

" O " mark in the following table means that it is necessary to adjust.

" --- " mark in the following table means that it is unnecessary to adjust.

Part Name	Confirmation of Tape Running	Linearity Adjustment	Sensor Sensitivity Adjustment	Confirmation of B.E.R. Value	Tension Adjustment
MECHA. CHASSIS	---	---	---	O	---
MECHA. CHASSIS (1) U.	O	O	---	O	---
DUMPER U.	---	---	---	O	---
GARAGE U.	---	---	---	O	---
CYLINDER U.	---	O	---	O	---
CYLINDER SPRING	---	O	---	O	---
TR ARM	O	---	---	O	O
TR BAND	---	---	---	O	O
TENSION SPRING	---	---	---	O	O
REEL PLATE U.	---	---	O	O	O
IDLER U.	---	---	---	O	O
PINCH ARM U.	O	---	---	O	O
T3 ARM U.	O	---	---	O	O
LOADING MOTOR U.	---	---	---	O	---
TR ROD	---	---	---	O	O
BRAKE GEAR	---	---	---	O	O
S-BOAT U.	O	---	---	O	O
T-BOAT U.	O	---	---	O	O
S-POST LOADING BAND	O	---	---	O	O
T-POST LOADING BAND	O	---	---	O	O
RAIL	---	---	---	O	O
CONNECTION WORM	---	---	---	O	O
MODE SW U.	---	---	---	O	O
T LOAD GEAR U.	---	---	---	O	O
CENTER GEAR	---	---	---	O	O

5.2. ADJUSTMENT PROCEDURE

No.	Item	Procedure	
1	Confirmation of Tape Running	Equipment	1. Mini DV Cassette
		Specification	Refer to Fig. 1-1 and Fig. 1-2
		1) Confirm each post position in playback mode. (Fig. 1-1) 2) Confirm condition of tape regulation of each post in playback and review modes. / (Fig. 1-2)	
2	Linearity Adjustment	Equipment	1. DV Alignment Tape (VFM3110EDS) 2. ENV Detector Board (VFK1641) 3. Mesuring Board (VFK1308E) 4. 232C(M3) I/F Cable (VFK1395) 5. EVR Connector Board (VFK1309) 6. ConnectionAdaptor (VFK1309EX) 7. 30 pin Flat Cable(X2) (VFK1317 or VFK1511) 8. DC Output Cable (VJA0941) 9. Personal Computer
		Specification	Refer to Fig. 2-5
		1) Connect the cables and boards between camera unit and P (Fig. 2-1) 2) Connect the ENV Detector Board between Mesuring Board Oscilloscope. / (Fig. 2-2) 3) Remove the Adjustment Cover. (Fig. 2-3) 4) Playback the Alignment Tape. 5) Adjust S1 and/or T1 posts by screw driver until waveform is spec. (Fig. 2-4, Fig. 2-5) 6) After Linearity adjustment, B.E.R. value should be confirmed by using Tatsujin / AdjustmentKit.	
3	Sensor Sensitivity Adjustment	Refer to Tatsujin Adjustment.	
4	Confirmation of B.E.R. Value	Refer to Tatsujin Adjustment.	
5	Tension Adjustment	Refer to TR Band & TR Arm U. assembly section of this manu	

Fig. 1-1

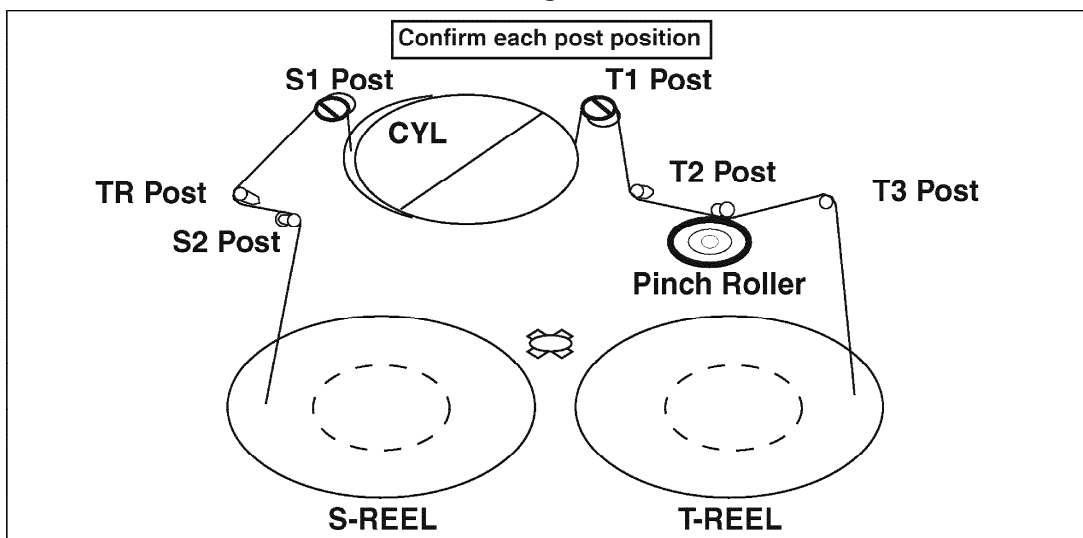
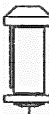


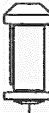
Fig. 1-2

PLAYBACK MODE

	Condition of Tape Regulation						
	A	B	C	D	E	F	G
	Upper Curl	Upper Regulation	Center Regulation	Lower Regulation	Lower Curl	Edge Bending	Edge Slacking
							
S2 POST	NG	NG	OK	OK	NG	NG	NG
S1 POST	NG	OK	NG	NG	NG	NG	NG
T1 POST	NG	OK	NG	NG	NG	NG	NG
T3 POST	NG	NG	OK	NG	NG	NG	NG

*S1 and T1 Posts can be adjusted. (Refer to Linearity Adjustment)

REVIEW MODE

	Condition of Tape Regulation						
	A	B	C	D	E	F	G
	Upper Curl	Upper Regulation	Center Regulation	Lower Regulation	Lower Curl	Edge Bending	Edge Slacking
							
S2 POST	NG	NG	OK	OK	NG	NG	NG
S1 POST	NG	OK	NG	NG	NG	NG	NG
T1 POST	NG	OK	OK	OK	NG	NG	NG
T3 POST	NG	OK	OK	OK	NG	NG	NG

*S1 and T1 Posts can be adjusted. (Refer to Linearity Adjustment)

Fig. 2-1

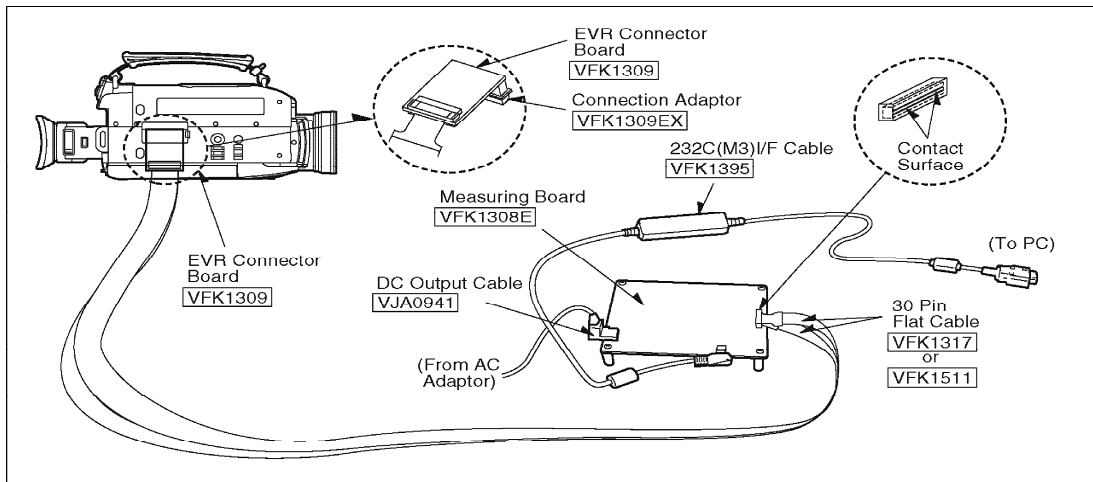


Fig. 2-2

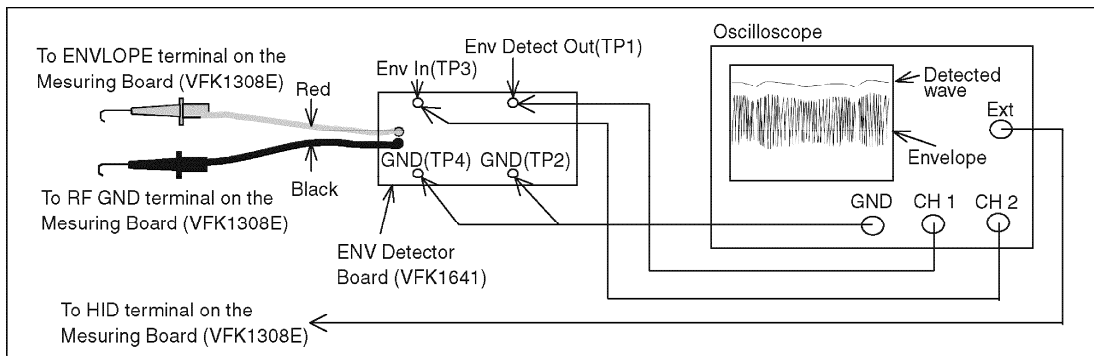


Fig. 2-3

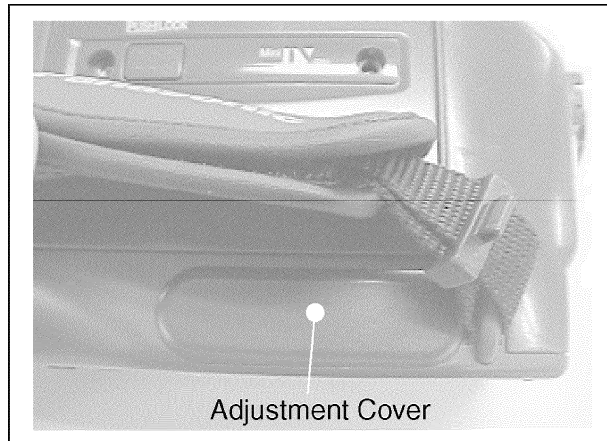


Fig. 2-4

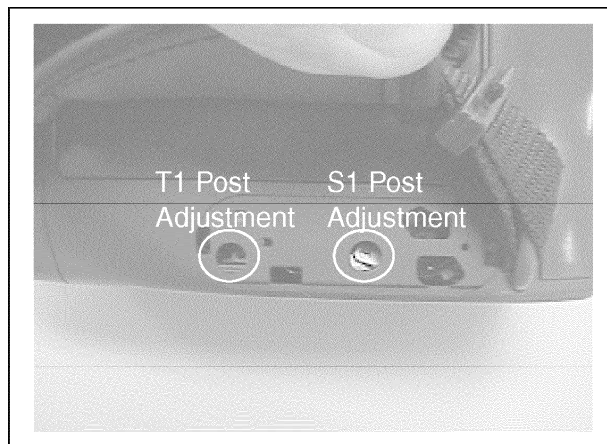
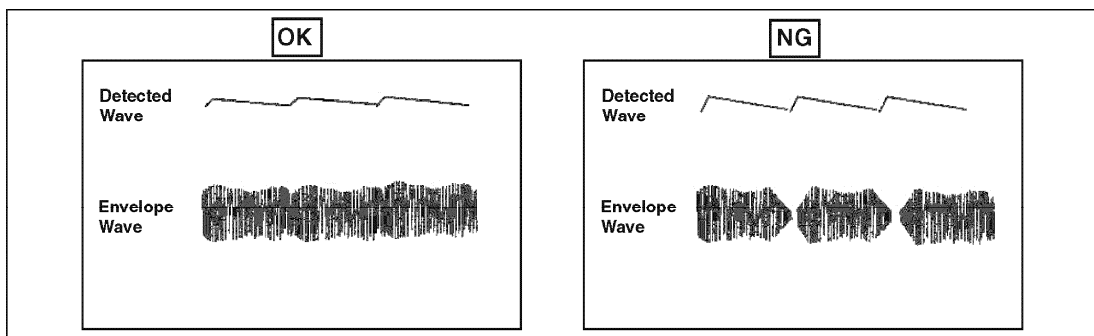
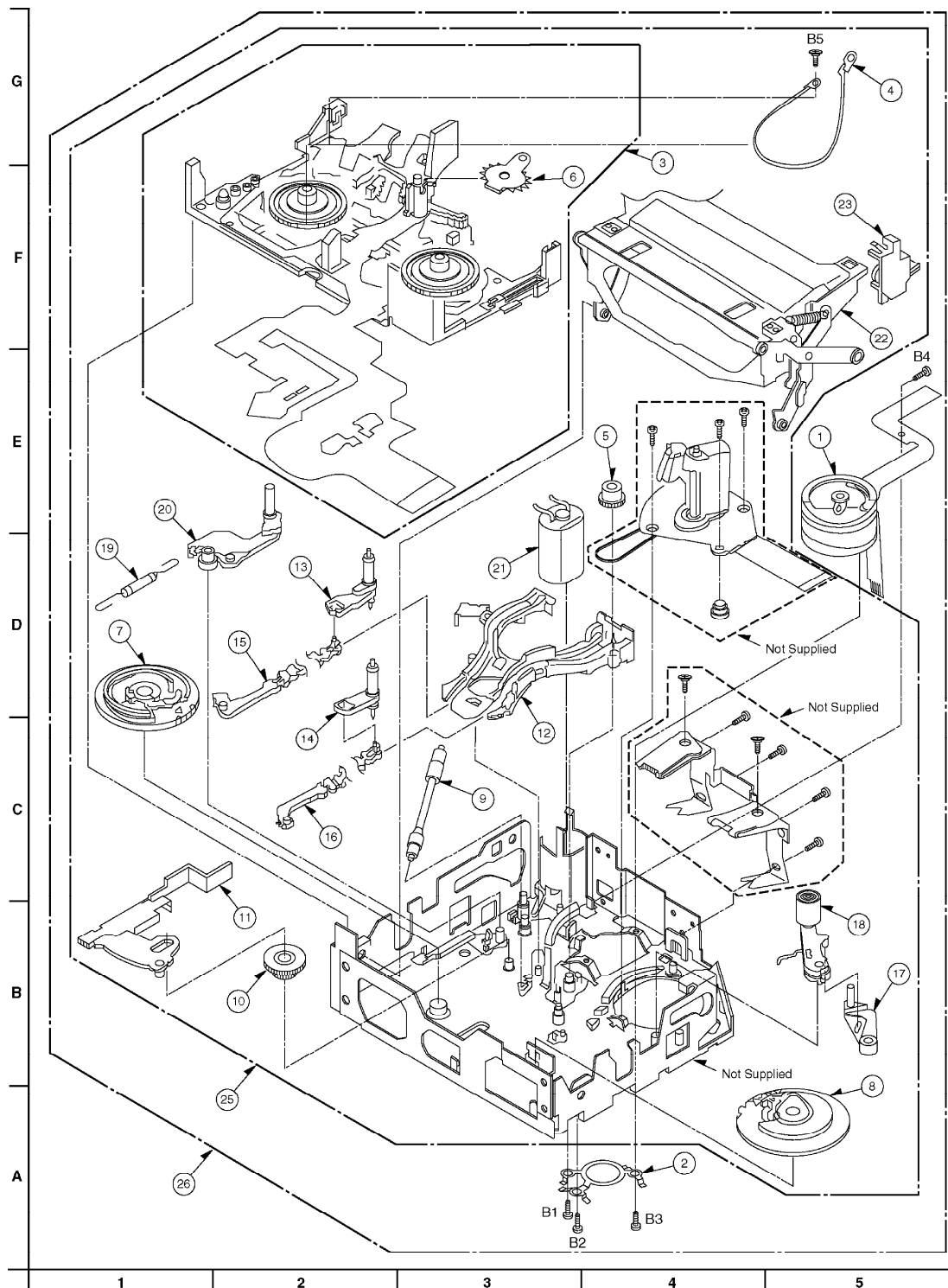


Fig. 2-5



6. EXPLODED VIEWS

6.1. VCR MECHANISM SECTION



7. REPLACEMENT PARTS LIST

7.1. VCR MECHANISM SECTION PARTS LIST

Note: 1. *Be sure to make your orders of replacement parts according to this list.
 2. IMPORTANT SAFETY NOTICE
 Components identified with the mark Δ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
<u>1</u>	VEG1576	CYLINDER U.	
<u>2</u>	VMC1702	CYLINDER SPRING	
<u>3</u>	VXA6999	REEL PLATE U.	
<u>4</u>	VMC1701	TR BAND	
<u>5</u>	VDG1498	CENTER GEAR	
<u>6</u>	VXA6997	IDLER U.	
<u>7</u>	VXA7001	MODE SW U.	
<u>8</u>	VXA7002	T LOAD GEAR U.	
<u>9</u>	VDG1496	CONNECTION WORM	
<u>10</u>	VDG1497	BRAKE GEAR	
<u>11</u>	VMA0J34	TR ROD	
<u>12</u>	VMD4184	RAIL	
<u>13</u>	VXA6995	S-BOAT U.	
<u>14</u>	VXA6996	T-BOAT U.	
<u>15</u>	VMD4181	S-POST LOADING BAND	
<u>16</u>	VMD4182	T-POST LOADING BAND	
<u>17</u>	VXL3096	T3 ARM U.	
<u>18</u>	VXL3095	PINCH ARM U.	
<u>19</u>	VMB3510	TENSION SPRING	
<u>20</u>	VXL3092	TR ARM	
<u>21</u>	VEM0744	LOADING MOTOR U.	
<u>22</u>	VXA7003	GARAGE U.	
<u>23</u>	VXP2111	DUMPER	
<u>25</u>	VXY1629Z1	MECHA. CHASSIS (1) U.	
<u>26</u>	VXY1629	MECHA. CHASSIS	(RTL)
<u>B1</u>	VHD1428	SCREW	
<u>B2</u>	VHD1428	SCREW	
<u>B3</u>	VHD1428	SCREW	
<u>B4</u>	XQN14+B1FN	SCREW	
<u>B5</u>	VMS6968	SCREW	